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GENUS LABORDIA

HAWAIIAN EUPHORBIACEAE

LABIATAE AND COMPOSITAE

BY

EARL EDWARD SHERFF
RESEARCH ASSOCIATE, SYSTEMATIC BOTANY

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BOTANICAL SERIES
FIELD MUSEUM OF NATURAL HISTORY
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PREFACE

Several years ago I was urged by Mr. Otto Degener, author of the currently appearing Flora Hawaiiensis, and somewhat later by Dr. Carl Skottsberg, Director of the Arboretum of Gothenburg, to undertake a revisional study of the Hawaiian genus, *Labordia*, of the family *Loganiaceae*. In due course of time such a study was made. During its progress, facilities for research were afforded me by the Field Museum of Natural History and it is a pleasure to acknowledge here my indebtedness to the authorities of the Museum.

Various other institutions and certain private workers very generously co-operated in the lending of plant materials, without which any attempt at revisional study of *Labordia* would have been largely futile. More particularly must I express my indebtedness and gratitude for such aid to the following individuals: Dr. Ludwig Diels, Director, Botanical Garden of Berlin; Dr. Peter Buck, Director, Mr. Edwin H. Bryan, Jr., Curator of Collections, and Dr. Harold St. John, Botanist, Bernice Pauahi Bishop Museum; Dr. Karl McKay Wiegand, Professor of Botany, Cornell University; Mr. Otto Degener, owner and custodian of the Degener Herbarium, Honolulu; Dr. B. P. G. Hochreutiner, Director, Delessert Herbarium; Dr. Carl Skottsberg, Director, Gothenburg Arboretum; Dr. Merritt Lyndon Fernald, Director, and Mr. Charles A. Weatherby, Senior Curator, Gray Herbarium of Harvard University; Sir Arthur W. Hill, Director, Royal Botanical Gardens of Kew; Dr. Carl Otto Rosendahl, Chairman of Department of Botany, University of Minnesota; Dr. George Thomas Moore, Director, and Dr. Jesse More Greenman, Curator of Herbarium, Missouri Botanical Garden; Dr. Karl Keissler, Director, Department of Botany, Natural History Museum, Vienna; Dr. Henry Allan Gleason, Head Curator and Assistant Director, New York Botanical Garden; Dr. H. Humbert, Professor, Museum of Natural History, Paris; Dr. William R. Maxon, Curator, United States National Museum; and Dr. F. R. Fosberg, recently of the University of Pennsylvania.

As in the case of former revisional investigations, photographs were taken of practically all available type specimens and of numerous cotype[1] or otherwise important supplementary specimens. A set of these is in my own collection and a duplicate set is in the Herbarium of Field Museum of Natural History.

[1] The term "cotype" is used throughout to connote a *duplicate of the type* (i.e., a paratype).

An attempt has been made to cite fully all *exsiccatae* examined. It must be noted, however, that in the case of plants collected by Mr. Degener and his associates, I have usually been permitted to examine the entire set of undistributed duplicates for any one collection number. So, too, for the collections of unmounted materials lent by Bishop Museum, it has been possible to study in numerous instances a representative set of undistributed duplicates. It is probably needless to add that from a study of so much additional material, supplemented many times by privately cummunicated field data from the collectors themselves, invaluable aid has been received in the interpretation of various taxonomic entities within the genus.

GENUS LABORDIA

EARL EDWARD SHERFF

HISTORY OF THE GENUS

The history of *Labordia* is simple, direct, and lacking in complications. The genus was founded by Gaudichaud in 1830 (Voy. Freycinet Bot. 449). He based it upon a single species, his own *Labordia Fagraeoidea*, the type of which he had found on the Island of Oahu in 1819. Gaudichaud spelled the generic name *Labordia*, although he created the name in honor of Mr. Laborde, an officer-of-marine and an unfortunate companion who had died at sea in the vicinity of the Isle of France. Subsequently, Asa Gray (Proc. Amer. Acad. 4: 321. 1860) and William Hillebrand (Fl. Haw. Isls. 288. 1888) used the spelling *Labordea* and this spelling gained limited acceptance in literature and in herbaria. The original spelling *Labordia* must be retained according to rules, however, and in fact has been accepted by most of the abler authorities who have treated the genus (e.g., Alphonse De Candolle, Prodr. 9: 21. 1845; Bentham & Hooker, Gen. Pl. 2: 792. 1876; Hans Solereder in Engler & Prantl, Natürl. Pflanzenfam. ed. 1, 4^{II} : 32. 1895; Joseph F. Rock, Indig. Trees Haw. Isls. 401. 1913; Wolfgang Klett, Botan. Archiv 5: 323. 1924; Otto Degener, Fl. Haw. fam. 302, Aug. 10. 1932; and Harold St. John, Occas. Paps. Bish. Mus. 10: no. 4: 4. 1933).

In 1860, Asa Gray (loc. cit.) discussed at some length the relationship of *Labordia* Gaud. to its sister genus, *Geniostoma* Forst. He described three species, two of them intended as new: *L. Tinifolia* A. Gray, *L. Fagraeoidea* Gaud., and *L. sessilis* A. Gray. *L. Tinifolia* is retained in the present revisional monograph. *L. Fagraeoidea*, as described by Gray, was based on specimens by the South Pacific Exploring Expedition, from the Island of Hawaii, and becomes *L. Hedyosmifolia* var. *Grayana*. *L. sessilis* becomes *L. Fagraeoidea* var. *sessilis*. Gray attempted no complete treatment of *Labordia*, but in a rather indefinite way advanced the new name *Geniostomoides* for an implied generic section typified by his new *L. Tinifolia*. He recorded the aestivation of the corolla in (our) *L. Hedyosmifolia* var. *Grayana:* "the lobes of the corolla in aestivation decidedly, though narrowly, overlap in a convolute manner, and are slightly twisted towards the observer's left." So far as my observations on specimens

extend, Gray's description applies substantially to the entire genus.[1] It may be noted here that at an earlier date Bentham had presumed the aestivation of the corolla in *Labordia* to be valvate and the fruit to be baccate (cf. Gray, loc. cit.), and that later Edouard Bureau (Fam. Loganiac. 44, fig. 9, footnote 1. 1856; cf. Gray, loc. cit.), on dissecting three flowers of *L. Fagraeoidea*, concluded Bentham's presumption of valvate aestivation to be correct. The large collections of material more recently available show, however, that the fruit is capsular and the aestivation is as Gray reported, or, to quote Hillebrand (Fl. Haw. Isls. 288. 1888), that the corolla-lobes are "sinistrorsely [cf. footnote 1] contorted in the bud, slightly overlapping."

Shortly after the publication of Gray's paper, Horace Mann made a noteworthy contribution to our knowledge of the genus (Proc. Amer. Acad. 7: 196 [Enum. Haw. Pl. nos. 383–387]. 1867). He described three new species: *L. pallida*, *L. hirtella*, and *L. membranacea*. All of these have proved valid. In addition, he discussed *L. Fagraeoidea* Gaud., referring to that species Mann & Brigham 434, a plant which, however, is seen to have been undescribed in Mann's day and which must be referred to *L. Hedyosmifolia* var. *centralis* of the present treatment. Mann erroneously synonymized Gray's concept of *L. Fagraeoidea* with his own new *L. pallida*. As already indicated, the material assumed by Gray to represent *L. Fagraeoidea* Gaud. is *L. Hedyosmifolia* var. *Grayana* as here treated.

In 1872, Heinrich Wawra wrote briefly upon *Labordia*, describing as new several plants which he had collected in the Hawaiian Islands from the end of December, 1869 to the first day of May, 1870. Of these, *L. waialealae* is to be retained and might indeed be considered as typifying a new section if it were not for the numerous transitional forms which occur and definitely unite it with sect. *Rabdolia*. His *L. pallida* f. *alpina* was later named by Hillebrand, *L. Fagraeoidea* var. *pumila* and more recently, and very properly, it has been raised by Skottsberg to specific rank (*L. pumila*). A species described by him from Oahu, *L. waiolanii*, reduces to *L. molokaiana* var. *phyllocalyx* of my text. We may note here that two of Wawra's

[1] As has been remarked elsewhere, however, Gray's method of determining the direction of twisting for the corolla-lobes, while used by various other botanists, was such as to give a direction exactly opposite to that obtained by following the method used by the majority of botanists (cf. B. Daydon Jackson, Glossary Bot. Terms, ed. 3, 423, append. C. 1916). The lobes do, as Gray said, appear twisted to the observer's left, i.e. sinistrorse, if the corolla be held erect and viewed perpendicularly to its lengthwise axis and from the outside. This means, of course, that when viewed from above the corolla, the twisting is clockwise and is thus what may more properly be designated as dextrorse.

specimens, his nos. 2,200 and 2,200*b*, were misdetermined by him as *L. Fagraeoidea* Gaud., although they were in reality an undescribed species. They will be found in this text as *L. Wawrana.*

In 1880, Henri Baillon, writing *"sur la tribu des Labordiées"* (Bull. Soc. Linn. Paris 1: 238) discussed various species with special reference to sexuality of flowers and diversity among inflorescences. He concluded that *Labordia* must be merged with *Geniostoma.* He proposed two sections to include certain species of *Geniostoma* (in its contemplated broader sense), namely *Rabdolia* and *Darbolia.* He set forth five new species, besides discussing certain previously known ones. His paper was written in some respects very carelessly and lacked definiteness in treatment. His five new species were: *Labordia Echitis, Geniostoma Cyrtandrae, G. Remyana, L. Hedyosmifolia,* and *L. molokaiana.* It should be observed that while he had concluded *Labordia* to be reducible to *Geniostoma,* he continued to employ the name *Labordia* for certain of his binomials. He placed the first two of these five species in the section *Rabdolia.* The remaining three he seems not to have assigned to any section. He did, however, cite *L. Tinifolia* A. Gray as a basis for his second section, *Darbolia* (which will be recognized as equivalent to the earlier but less definitely established *Geniostomoides* A. Gray). In my own monographic study of *Labordia,* it has seemed wise to adopt both of the sections proposed by Baillon for *Geniostoma,* transferring them of course to the genus *Labordia.*

Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 156. 1936; see also p. 498 of the present text) regarded Baillon's five proposed names as representing "little more than nomina nuda." With the exception of *L. Echitis,* however, they were substantiated with sufficient descriptive matter to compel their recognition. *G. Remyana* is found to be synonymous with *L. Hedyosmifolia* var. *Grayana,* thus reducing Baillon's species to three that are valid. Of these three, *G. Cyrtandrae* was set forth later by Skottsberg (loc. cit.) as *Labordia Cyrtandrae* (although perhaps unwittingly). We have, then, three species of *Labordia* proposed by Baillon and here retained: *L. Cyrtandrae, L. Hedyosmifolia,* and *L. molokaiana.*

Following Baillon, but evidently with no knowledge of Baillon's work on *Labordia,* came William Hillebrand. In his Flora of the Hawaiian Islands (pp. 288–293. 1888) he presented the first comprehensive and systematic treatment of the genus. During his twenty years of residence and active botanical investigation in the Hawaiian Islands, Hillebrand had acquired a vast fund of information touching

Labordia. Much of this is revealed in his text. For the section *Geniostomoides* A. Gray, he employed the slightly different name, *Geniostomoideae*. For the rest of the genus he used the sectional designation *Labordeae verae*. In the *Geniostomoideae* (our *Darbolia*) he described the valid *L. triflora* and two unnamed varieties of *L. Tinifolia* (var. β=*L. Tinifolia* var. *parvifolia;* var. γ—as to first cited locality of Kauai=*L. Helleri* and var. *macrocarpa*). In the *Labordeae verae* (our *Rabdolia*) he described a number of new species and varieties, which are disposed of in my text as follows: *L. lophocarpa=L. molokaiana* var. *lophocarpa; L. lophocarpa* var. *pluriflora=L. molokaiana; L. lophocarpa* var. *phyllocalyx=L. molokaiana* var. *phyllocalyx; L. Grayana=L. Hedyosmifolia* var. *Grayana; L. glabra,* retained; *L. hirtella* vars. *microphylla* and *microcalyx,* retained.

Early in the present century, Joseph F. Rock collected *Labordia* extensively and tentatively created a number of new herbarium names which he later failed to publish. In his *Indigenous Trees of the Hawaiian Islands* (403–406, plates 164 and 165. 1913), he declared his intention of comparing "his specimens with the types in the various Herbaria of Europe." Notes on certain herbarium sheets in Berlin and elsewhere show that he made at least some comparisons, but his attention was later diverted to other matters and he never concluded a revisional study of the genus.

Almost contemporaneous with Rock's work was that of Charles N. Forbes. Hundreds of specimens of *Labordia* were collected and determined by him. His *L. kaalae* (Occas. Paps. Bish. Mus. 6: 174 and plate. 1916) and *L. Lydgatei* (op. cit. 176 and plate) were described from material collected or studied by him and have proved thoroughly valid. He left various notations upon the labels or the sheets to his specimens and these in many cases have been of value. Unfortunately, Forbes' untimely death, in 1920, terminated his labors upon *Labordia* and other Hawaiian genera.

In 1924, Wolfgang Klett (Botan. Archiv 5: 312) published his "Umfang und Inhalt der Familie der Loganiaceen." He presented a key to the thirty-three genera of Loganiaceae recognized by him, also descriptions of and critical notes upon each genus. In *Labordia,* which he retained as separate from *Geniostoma,* he gave the number of species as eighteen, although which ones these were he did not state.

Beginning at about the same time that Rock and Forbes and Klett did their work, numerous additional specimens of *Labordia* have been collected, notably by George C. Munro, by Otto Degener and his associates, by Carl Skottsberg, by Harold St. John, by

Francis Raymond Fosberg, and by Edward Yataro Hosaka. Of these specimens, certain ones were described by Degener (Fl. Haw. fam. 302, August 10, 1932) and by St. John (Occas. Paps. Bish. Mus. 10: no. 4: 4. 1933) under the name *L. hypoleuca* Deg., a name which, however, reduces to synonymy with *L. Cyrtandrae*. More recently, Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 153–164. 1936) has published a detailed study of *Labordia*. He described *L. Grayana* var. *centralis*, which is our *L. Hedyosmifolia* var. *centralis*, and, apparently with justice, elevated *L. Fagraeoidea* var. *pumila* Hillebr. to specific rank, our *L. pumila*.

Skottsberg's work is important, however, more particularly for its critical discussions. He reviews the history of *Labordia* regarding sexual dimorphism of the flowers. He refers to the previously used descriptive terms, *polygamous-dioecious* and *hermaphrodite*, only to discard them, almost for a certainty, in favor of a truly dioecious habit. To quote his own words: "In the specimens of the five species of *Labordia* examined by me I have not come across a single case of true hermaphroditism and I never found more than one kind of flowers, either staminate or pistillate, on the same branch. From this I conclude that at least these five species have unisexual and probably dioecious flowers." (It may be added here, incidentally, that throughout my own studies of *Labordia*, I have seen no certain evidence of any other than a dioecious habit. Very recently, however, Dr. Skottsberg has sent me a specimen of *L. Hedyosmifolia* Baill.—*Cranwell, Selling, & Skottsberg* 3166*b*—with the notation, "all flowers bisexual except one staminate.") Skottsberg presents many small, carefully delineated sketches of floral organs observed in the several species studied and the reader is referred to these for a deeper insight into the processes of anthesis and fructification in *Labordia*. Skottsberg's description of the situation preliminary to anthesis in staminate flowers likewise should receive attention: "Before the staminate flowers open, the anthers, which surround the pistil tightly, have deposited their pollen on the closed stigma which is densely covered with long porrect papillae and may act like a brush sweeping out the pollen. I have found pollen thick on the stigma above the tips of the anthers."

Following closely upon Skottsberg's paper was that by St. John (A Revision of the Hawaiian Species of *Labordia* Described by H. Baillon: Occas. Paps. Bish. Mus. 12: no. 8: 1–11, *pls. 1–4*. 1936). St. John, during his stay in Paris in 1936, had "investigated the types of the Hawaiian species of *Labordia* described by H. Baillon."

He presents a critical discussion which, though short, is of classic importance to our correct understanding of the genus. He agrees with Solereder in Engler and Prantl (Natürl. Pflanzenfam. 4^{II}: 30–31. 1895) in maintaining *Labordia* as a separate genus apart from *Geniostoma* and writes that they both "seem to have sufficient morphological characters. *Geniostoma* occurs from Madagascar to Fiji, and has the inflorescence from the lower leafy axils and the corolla-tube short rotate. *Labordia* occurs only in the Hawaiian Islands, and has the flowers terminal, single or in sessile or peduncled cymes, and the corolla-tube well developed, cylindric." He attempts no maintenance of subgeneric sections, having earlier committed himself (op. cit. 10: no. 4: 5. 1933), for what seems to me an ill considered and insufficient reason, in favor of abolishing sections within *Labordia*. He sets forth and pictures the type of *Geniostoma Cyrtandrae* Baill. with the professedly new combination *Labordia Cyrtandrae* (Baill.) St. John, but in an earlier paper known to and cited by him, though manifestly overlooked by him in this connection, Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 156. 1936) had already published this combination (though, as previously stated on page 451, perhaps unwittingly, since he incorrectly attributed the combination to Baillon himself). St. John then proceeds to *Labordia Hedyosmifolia* Baill. and *L. molokaiana* Baill., both of which he illustrates from photographs of the respective types and discusses briefly. To varietal rank under the former he very properly transfers *L. Grayana* var. *centralis* Skottsb. He places *Geniostoma Remyana* Baill. and *L. Grayana* Hillebr. as synonyms under *L. Hedyosmifolia*, but it should be observed here that these are better treated as var. *Grayana*, and this is accordingly done in my text. *Labordia Echitis* Baill. is recognized as a nomen nudum, but its type is illustrated with a plate fully described, and renamed *L. Baillonii* St. John.

A brief view in retrospect of the literature on *Labordia* shows some doubt to have obtained as to the validity of *Labordia* apart from *Geniostoma*. Thus Asa Gray (Proc. Amer. Acad. 4: 322. 1860), in establishing his new *L. Tinifolia*, wrote: "So we must annex this ambiguous species to *Labordia*, unless we merge the latter genus in *Geniostoma*, which at present would hardly be warranted." Bentham and Hooker (Gen. Pl. 792. 1876) took a strong stand in favor of retaining *Labordia* separately. Thus they wrote: Generis affinitatem maximam cum *Geniostomate* rite indicavit A. Gray, sed abunde distinguitur habitu, inflorescentia, calyce, corollae lobis angustis, et stigmate in laminas longas diviso. Hunc characterem in floribus

in alabastro examinatis facile praetermissum, in speciebus duabus observavimus." However, Bentham and Hooker confessed doubt as to the affinity of *L. Tinifolia*, preferring to place it with *Geniostoma: "Labordia tinifolia*, A. Gray, l.c., corollae tubo pariter elongato characteres caeteros calycis styli etc. potius *Geniostomatis* quam *Labordiae* praebet, excepta inflorescentia quae terminalis pedunculata et laxe trichotoma cum neutro genere convenit." Hillebrand (Fl. Haw. Isls. 292. 1888) and all writers since his day known to me have, none the less, kept *L. Tinifolia* with *Labordia*. The discovery, since Bentham and Hooker's time, of several additional species which were clearly congeners of *L. Tinifolia* and which displayed a greater range of variation and overlapping with the orthodox *Labordia* species than noticeable in *L. Tinifolia*, confirms the wisdom of such a course. Indeed, St. John (Occas. Paps. Bish. Mus. 10: no. 4: 5. 1933) felt the transitions between orthodox *Labordia*, as represented by *L. Cyrtandrae* (*L. hypoleuca* Deg.) and *L. Tinifolia* to be such as to justify abolishing, as already stated (p. 454), sections within *Labordia;* that is, of retaining *L. Tinifolia* and its closer congeners as species of *Labordia* without sectional distinction from the other species. My own work convinces me that *Labordia* is a valid genus, and that *L. Tinifolia* and its closer allies belong to *Labordia*, although preferably as a distinct section. The two section names used by Baillon (*Rabdolia* and *Darbolia*) are withdrawn from *Geniostoma*, where they were placed by him, and used here under *Labordia* (*vide pp. 456 et 457*).

Genus **LABORDIA** Gaud.: Description

Gaudichaud, Voy. Freycinet Bot. 449. 1830.

Shrubs or small trees. Leaves opposite, entire or obscurely dentulate, obliquely pinnate-nerved, mostly petiolate; petioles in most species (*Labordiae verae* Hillebr.) basally more or less adnate to dorsal surface of axillary, sheathing, laterally somewhat or scarcely connate stipules. Inflorescence a terminal cyme (this simple or compound, corymbiform or paniculate or less often subumbellate) or in some cases reduced to a single flower; peduncle subtended by a pair of bracts, pedicels with small linear bractlets at about their middle. Flowers more or less dioecious, but seemingly dimorphic ordinarily only as to anthers and pistils.[1] Calyx persistent; sepals usually 5, more often connate, quincuncially imbricate in the bud, basally glandular on inner face, usually unequal in length and the

[1] As to an apparent exception, see under *Labordia Tinifolia var. γ leptantha*, p. 534.

outer ones commonly broadest. Corolla subcoriaceous, yellow or greenish; tube cylindrical; the usually 5 lobes narrow, acute, erect or spreading. Anthers 5, subsessile at sinuses of corolla-lobes, partly exserted, linear-oblong, acute, affixed dorsally at their middle or near their base, 2-celled; in pistillate flowers shorter, more slender, and apparently always sterile. Pistil (represented in staminate flowers by the pistillode) commonly surpassed by corolla-tube, its three parts usually well differentiated; ovary ovoid, incompletely 2–3-celled, the numerous ovules anatropous or nearly amphitropous and on thick, apparently axial placentas; style short and thick to long and slender, straight or rarely bent or twisted; stigmas 2 or 3, erect, complanate or trigonous, commonly more or less coalesced into a short, frequently truncate, 2–3-lamellate, cephaloid body. Pistillode more slender and elongate than the corresponding pistil, its style often equaling or exceeding the corolla-tube, the stigmas more often connate or completely fused and appearing collectively more or less elongate-clavate. Fruit a capsule with thick exocarp, dehiscent from apex downward or from base upward or both ways, the ligneous or pergameneous valves, with part of the introverted dissepiments, breaking away from the finally free and pulpy placentas. Seeds small (±2–3 mm. long), ovoid, smooth, imbedded in an orange-colored or greenish pulp. Embryo straight-cylindrical, nearly as long as the fleshy albumen, the radicle little longer than the cotyledons and nearly as broad.[1]

CONSPECTUS OF SECTIONS

Labordia sect. **Rabdolia** (Baill.) comb. nov.; *Geniostoma* sect. *Rabdolia* Baill. Bull. Soc. Linn. Paris 1: 239. 1880; *Labordia* sect. *Labordeae verae* Hillebr. Fl. Haw. Isls. 288. 1888.

Innovations from the uppermost axils below the inflorescence, therefore the branches dichotomous, enclosing between them the old fruits. Branchlets mostly subangular to angular or even alate, the leaves crowded near their ends. Stipules intrapetiolar, usually 2–5 mm. tall, more or less auriculiform and dorsally adnate to the petiolar base, laterally somewhat connate. Flowers solitary or more often cymosely disposed; cyme variously subumbellate to shortened-corymbiform or very rarely paniculate, but usually sessile or nearly so (pedunculate in *L. pedunculata*). Calyx divided almost or commonly all way to base into lobes or sepals, these unequal, the outer ones in some species and varieties more or less foliaceous. Corolla orange-colored or yellow or rarely (*L. Cyrtandrae*) pale greenish-

[1] Description modified from that by Hillebrand, Fl. Haw. Isls. 288. 1888.

yellow, the apices of its long-acuminate lobes patent or more rarely appressed in the bud; mature pistil entire at top or but slightly cleft. Capsule 2- or 3-valved, the valves woody. Nos. 1–18.

Labordia sect. **Darbolia** (Baill.) comb. nov.; *Geniostoma* sect. *Darbolia* Baill. Bull. Soc. Linn. Paris 1: 239. 1880; *Labordia* sect. *Geniostomoides* A. Gray, Proc. Amer. Acad. 4: 322. 1860; *Labordia* sect. *Geniostomoideae* Hillebr. Fl. Haw. Isls. 289. 1888.

Innovations not confined to uppermost axils. Branchlets terete or rarely angular especially toward apex, pale, with leaves distant. Stipules low-annular, rather interpetiolar, not forming a rising auricle inside the petiole. Cyme pedunculate, simple or paniculate. Calyx small, 5-fid with equal or subequal narrow lobes. Corolla slender, hypocrateriform, greenish, its lobes closed to the apex in the bud; mature pistil entire at top or but slightly cleft. Capsule mostly 2-valved, valves pergameneous. Nos. 19–23.

CONSPECTUS OF SPECIES, VARIETIES, AND FORMS

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KEY

a. Leaf-blades appressedly hispidulous beneath with dark-rufous setulae.

b. Capsular valves distinctly carinate toward apex even in young capsule . . . . . 13. *L. membranacea* and var. β *exigua.*

b. Capsular valves ecarinate . . . . . 15. *L. olympiana.*

a. Leaf-blades otherwise.

b. *Leaf-veins all or all but the largest completely covered on salient lower surface with densely matted, short, sharp, arcuate setulae, these concealing the veins to a lens;* inflorescence sessile, compact, 10–30-flowered; plant native of northeastern East Maui . . . . . 7. *L. venosa.*

b. Leaf-veins glabrous beneath or more loosely and openly setulose.

c. Capsular valves 2 (about 12–13 mm. long), *longitudinally and reticulately veined on outer surface;* inflorescence paniculate-cymose, ±25-flowered; calyx glabrous, about 2 mm. tall, lobes ovate-cordate, at margin conspicuously straw-yellow, at base more or less auriculate; plants native of Kauai. 18. *L. Helleri* and var. β *macrocarpa.*

c. Capsular valves not reticulately or longitudinally veined on outer surface.

d. Capsule globose, smooth, ecarinate, 2-valved, *only about 4 mm. thick;* cyme open, delicate, 6–21-flowered, its branches capillary; calyx glabrous, about 2 mm. tall; plant native of southernmost Kauai . . . . . 19. *L. Lydgatei.*

d. Capsule much exceeding 4 mm. in thickness.

e. Branchlets angular with leaves crowded near their ends; innovations from the uppermost axils below the inflorescence, the branches thus dichotomous; stipules intrapetiolar (forming an erect auricle inside the petiole); calyx divided to the base into unequal lobes or sepals, the outer ones often foliaceous; corolla yellow, the apices of its long-acuminate lobes patent in the bud; capsular valves woody.

f. Principal leaves large, their blade usually 1–2 dm. long.

g. Branchlets mostly sterile or at most with abortive flowers and manifestly teratological.

2. *L. Fagraeoidea* var. *ε sessilis*.

g. Branchlets normally floriferous.

h. Leaves oblong-oblanceolate, 3–6 cm. wide, gradually narrowed into a margined petiole (this commonly under 1 cm. long), ±20 principal lateral veins to each side; corolla externally white-hispid; plant native of Kauai.

8. *L. Wawrana*.

h. Leaves obovate-oblong, 3–6 cm. wide, attenuate at both ends, petiole slender and 1–2.5 cm. long, 7–10 principal lateral veins to each side; plant native of Kauai.

3. *L. pallida* var. *β hispidula*.

h. Leaves broadly and at times somewhat obovately elliptic to ovate-elliptic, 2–14.5 cm. wide, moderately or broadly cuneate at base (petiole 1–5 cm. long), principal lateral veins 7–13 to each side; corolla externally glabrous or slightly pilosulous; plants natives of Oahu and northeasternmost East Maui.

11. *L. Cyrtandrae* and var. *β nahikuana*.

f. Principal leaves smaller, their blade usually less than 1 dm. long.

g. Calyx-lobes usually 0.3–0.6 the length of the corolla-tube; capsular valves ecarinate.

h. Inflorescence sessile or nearly so.

16. *L. hirtella* and vars.

h. Inflorescence pedunculate with a peduncle ±2 cm. long.....4. *L. pedunculata*.

g. Calyx-lobes at least as long as the corolla-tube.

h. Flowers single, rarely three.[1]

i. *Corolla enclosed entirely within the foliaceous calyx-lobes or sepals;* capsular valves carinate.
1. *L. molokaiana* and vars.

i. Corolla proportionately larger, its tube alone equaling the lanceolate calyx-lobes.
10. *L. glabra* and vars.

h. Flowers several or many.

i. *Pistil lacking a style;* leaves very glabrous, the lower surface (at least when dry) pale and glaucescent and beautifully arcuate-penninervate with much darker nerves; capsule ovoid-trigonous, 12–13 mm. long; plant native of northwestern Kauai.....5. *L. pumila.*

i. Pistil with a manifest style.

j. *Capsule 2–3 cm. long,* 2-valved, compressed or obcompressed, valves medianly more or less carinate (unless toward base) but not cristate; plants native of western Kauai.
14. *L. Degeneri* and var. *β subcarinata.*

j. Capsule smaller.

k. Leaf-blades usually 1–2.5 cm. long and with 3 or 4 principal lateral nerves to each side, marginally more or less revolute, with nerves often salient beneath; occasionally (especially on sterile shoots) even 5–7 cm. long and 3–4 cm. wide, more numerously nerved, but still often revolute; plant native of northwestern Kauai and possibly southeastern Molokai.....17. *L. waialeale.*

k. Leaf-blades otherwise.

[1] As Hillebrand very properly observes, "It often happens that of several flowers only one arrives at maturity; therefore it is not safe to infer from the presence of a single capsule the character of the inflorescence." (Fl. Haw. Isls. 289, footnote. 1888.)

Moreover, it may be remarked that certain species of the next group (e.g., *L. Fagraeoidea*) have at times branchlets terminated with only 1 or 2 flowers and so might seem to belong here.

l. Pistillode slenderly clavate, its elongate-obconic stigma gradually passing into and scarcely distinguishable from the style.

m. Leaf-blade 6–11 cm. long and 2–3.5 cm. wide; plant native of Kauai. 3. *L. pallida.*

m. Leaf-blade 3–6.5 cm. long and 8–15 mm. wide; plant native of northeastern East Maui. 9. *L. mauiensis.*

l. Pistillode more or less clavate but its stigma not obconic and not distinguishable with difficulty from the style.

m. Calyx-lobes or some of them usually reaching or exceeding lowest sinuses between corolla-lobes, i. e., equaling the corolla-tube.

n. Flowers usually in subumbellate cymes; leaves pale beneath or even on both surfaces; capsule usually globose-ovoid; plants natives of Oahu.

o. Leaf-blades short-ovate to obovate, conspicuously salient-nerved beneath, often revolute; sepals elongate, linear-oblong or linear-subulate, frequently ciliate.....6. *L. Hedyosmifolia* var. *θ Hosakana.*

o. Leaf-blades commonly somewhat narrower, the nerves scarcely or not at all salient beneath, margins rarely revolute; sepals often broader. 2. *L. Fagraeoidea* and vars.

n. Flowers usually in large, open, compound, corymbiform cyme (but in certain varieties and forms closely aggregated); leaves not pale beneath (unless on plants

from Island of Hawaii); capsule conic-ovoid.

6. *L. Hedyosmifolia* and vars.

m. *Calyx-lobes usually shorter than corolla-tube;* leaf-blades firm-chartaceous, elliptic-ovate, mostly 7–10.5 cm. long and 3.2–5.8 cm. wide; plant native of Hawaii..12. *L. Baillonii.*

e. Branchlets terete, pallid, with leaves distant; stipules low-annular, interpetiolar; calyx minute, 5-fid with equal lobes; corolla greenish, slender, salver-shaped, its lobes closed to the apex in the bud; capsular valves pergameneous.

f. Leaves (at least principal ones) basally subtruncate to cordate.

g. *Branchlets (including those of inflorescence) and lower leaf-surfaces tomentulose or hispidulous;* plant native of Oahu.....22. *L. kaalae.*

g. Branchlets (including those of inflorescence) glabrous or glabrate or at most papillate.

h. Leaves terminally narrowed and acuminate; cyme 3-flowered; plant native of southeasternmost Molokai.....20. *L. triflora.*

h. Leaves terminally broad or almost subrotund, at apex itself abruptly subacute; cymes mostly 5–many-flowered; plants natives of Oahu.

22. *L. kaalae* vars.

f. Leaves basally contracted.

g. Blades of principal leaves mostly 1–1.8 dm. long, gradually narrowed below middle to the more or less decurrent base, very membranaceous; median vein flat and about 1.5 mm. wide; petiole flat or toward base conduplicate, 1–2.5 cm. long; plant native of Oahu.....23. *L. decurrens.*

g. Blades of principal leaves mostly under 1 dm. long; usually not or at least less gradually narrowed below middle, not or but slightly decurrent on petiole; median vein inconspicuous or rounded-salient but under 1 mm. wide; petiole thickish and more terete.....21. *L. Tinifolia* and vars.

ABBREVIATIONS USED FOR HERBARIA CITED

Berl.	Herb. Berlin Botanical Garden, Berlin-Dahlem.
Bish.	Herb. Bernice P. Bishop Museum, Honolulu.
Brit.	Herb. British Museum of Natural History, South Kensington.
Corn.	Herb. Cornell University, Ithaca.
Deg.	Herb. of Otto Degener, Honolulu.
Del.	Herb. Delessert, Geneva.
Field	Herb. Field Museum of Natural History, Chicago.
Flor.	Herb. Institute of Botany, University of Florence, Italy.
Goth.	Herb. Arboretum Gothenburg, Sweden.
Gray	Herb. Gray, Harvard University, Cambridge, Massachusetts.
Kew	Herb. Royal Botanic Gardens, Kew.
Minn.	Herb. University of Minnesota, Minneapolis.
Mo.	Herb. Missouri Botanical Garden, St. Louis.
Mun.	Herb. Munich Botanical Garden, Germany.
Mus. V.	Herb. Museum of Natural History, Vienna.
N. Y.	Herb. New York Botanical Garden, New York City.
Par.	Herb. Museum of Natural History, Paris.
Petrop.	Herb. Botanical Garden of Leningrad (Hortus Petropolitanus), U.S.S.R.
Phila.	Herb. Philadelphia Academy of Natural Sciences, Philadelphia.
U. S.	Herb. United States National Museum, Washington.

1. **Labordia molokaiana** Baillon, Bull. Soc. Linn. Paris 1:240. 1880; cf. St. John, Occas. Paps. Bish. Mus. 12: no. 8: 7, *pl. 3*, 1936; *Labordia lophocarpa* var. *pluriflora* Hillebr. Fl. Haw. Isls. 290. 1888.

a. Ultimate branchlets very setulose.

b. Leaves often over 8 cm. long; plant of Molokai.*L. molokaiana sensu stricto.*

b. Leaves seldom over 7 cm. long; plant of Lanai.var. *γ Munroi.*

a. Ultimate branchlets smooth or scabrous but not or only very slightly setulose.

b. Sepals externally glabrous or slightly setulose.

c. Outer sepals (1.4–2 cm. long) moderately narrowed at base (plant of Molokai).....var. *β lophocarpa.*

c. Outer sepals more or less stipitate at base.

d. Outer sepals becoming 2–3.2 cm. long; plant of Oahu.
var. δ *phyllocalyx.*

d. Outer sepals under 1.8 cm. long; plant of Molokai.
var. ε *congesta.*

b. Sepals externally hispid.

c. Leaves sharply acuminate; branchlets subterete to weakly angulate; plant of Oahu.....var. η *Bryanii.*

c. Leaves subacute to barely acuminate; branchlets subalately tetragonal; plant of Molokai.....var. ζ *setosa.*

A much branching shrub, glabrous except for the younger branchlets (these slender, sharply ridged or angular, the last 1–3 internodes shaggy-setulose) and for the sparsely (or on veins moderately) appressed-setose lower surfaces of the leaves. Stipular sheath large, laterally emarginate. Leaves gradually narrowed from middle or from upper third into a slender or slightly margined petiole, this 0.8–1.5 or even to 2.4 cm. long; blade oblong-oblanceolate to narrowly obovate, apically acuminate, membranaceous, on principal leaves now 7–9 cm. long and 2–3.3 cm. wide (as in type) now even 10–15 cm. long and 3–4.6 cm. wide (as in type of *L. lophocarpa* var. *pluriflora* Hillebr.). Inflorescence of 1–3 often nodding flowers on subappressedly setulose pedicels 8–12 mm. long, bractlets linear or spatulate. Sepals distinctly acuminate, outer ones broadly ovate. Capsule obovoid-globose, 3-valved; valves medianly carinate above, ±1.3 cm. tall.

Type specimen: Collected by *Jules Remy*, no. 363, Molokai, 1851–1855 (Par.).

Distribution: Molokai.

Specimens examined: *Charles N. Forbes* 503–*Mo*, Halawa, September, 1912 (Bish.; with a single flower, this eaten out by insects); *Dr. William Hillebrand*, same locality (Berl.; type of *Labordia lophocarpa* var. *pluriflora* Hillebr.; fruiting); *Remy* 363 (type, Par.; sterile).

St. John (op. cit. 9) compared the type of *L. molokaiana* (Par.) with an isotype of *L. lophocarpa* Hillebr. (Kew) and found them "inseparable." *As to species*, they are indeed the same. A study, however, of the several sheets of Hillebrand's original Molokai material of *L. lophocarpa* (Berl.) and of various specimens of *L. lophocarpa* collected more recently, shows that *L. lophocarpa* as it occurs on Molokai differs consistently in having the terminal inter-

nodes of the branchlets practically or absolutely devoid of hispidity. The type of *L. molokaiana* (now before me) on the contrary has its branchlets abundantly setulose on the terminal internodes. Hillebrand was unfamiliar with Baillon's name and so, in describing *L. lophocarpa*, based the species proper upon the plants with glabrous branchlets, since these were apparently of the more widely distributed form and better known to him. He did, however, describe a var. *pluriflora* from Halawa, on Molokai, and his type of that variety (now before me) is seen to have the branchlets setulose toward the ends, as in the type of *L. molokaiana*.[1] It is a fruiting specimen, with leaves fewer than and twice as large as in the Remy plant, but in the absence of further evidence may well be considered identical, especially since such a range in leaf size is not uncommon within single varieties of *Labordia*.

The Molokai material of *L. lophocarpa* Hillebr. is seen to merit varietal rank under *L. molokaiana* (see var. *lophocarpa*). The Lanai material, of which several fine specimens have been seen, is fairly easy to distinguish from all the Molokai plants and is here treated under the var. *lanaiensis*.

Labordia molokaiana var. *β* **lophocarpa** (Hillebr.) Sherff, Amer. Journ. Bot. 25: 585. 1938; *Labordia lophocarpa* Hillebr. Fl. Haw. Isls. 289. 1888 (exclud. Lanai plants).

Younger branchlets fleshy but soon becoming rigid and more or less subalate-tetragonal, perhaps more foliose. Leaf petiole 4–15 mm. long; blade shortly acuminate at apex, gradually or subabruptly narrowed below, usually drying dark especially upon upper surface,

[1] Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 157. 1936) states: "The reasons for an identification [of *L. molokaiana* with *L. lophocarpa*] appear, however, to be weak; from a comparison between the statements made by Baillon and Hillebrand's good description, it is evident that the leaves must be quite different, narrow lanceolate in the former, elliptic to obovate-oblong in the latter. *L. molokaiana* has a few-flowered, contracted cyme, *L. lophocarpa* single terminal flowers." St. John (Occas. Paps. Bish. Mus. 12: no. 8: 9. 1936) quotes Skottsberg but concludes nevertheless that the differences emphasized by Skottsberg "are rather in terminology than in morphology. In both the leaves are oblanceolate and the flowers single and terminal." The differences cited by Skottsberg are, however, real. It may well be true, of course, that the single type specimen of *L. molokaiana* now has only one flower for an inflorescence. Indeed, the type seems now entirely to lack well developed flowers. But, notwithstanding this purely negative evidence, we have Baillon's original description: "Ses inflorescences sont contractées et pauciflores." Moreover, that the form of plant described by Baillon does at times have more than one flower to a single inflorescence, as implied in Baillon's "pauciflores," is confirmed in Hillebrand's description for the identical var. *pauciflora* ("Inflor. of 1–3 often nodding flowers") and in Hillebrand's prior use, on a field label for the type of his var. *pluriflora*, of the varietal name *triflora* (to distinguish it from the species which Hillebrand afterwards named *lophocarpa* but at the time designated, in pencil, *uniflora*).

commonly glabrous, 5–11 cm. long and 2–4 cm. wide. Inflorescence a single terminal flower or at times 3-flowered; pedicel puberulous, 4–10 mm. long; bractlets lanceolate or spatulate, about 1.2 cm. long. Calyx as long as corolla; sepals 4 or 5, distinct, broad and foliaceous, 1.4–2 cm. long (outer ones rounded, nearly as broad as high, shortly acuminate, 9–11-nerved; inner ones less than half as broad as high). Corolla deep yellow, enclosed in the calyx, externally glabrous, internally puberulous, its thick tube 10–12 mm. long, the lobes (often 6 or 7 in number) 6–8 mm. long. Style of fertile flowers about 4 mm. long, shorter than the broad, clavate stigma. Capsule (including crests) 1.2–1.4 or even up to 2.4 cm. tall, 2- or 3-valved, almost globose when 3-valved but complanate when 2-valved, the valves conspicuously carinate or crested above, the crests rounded and generally not confluent at apex.

Type specimen: Hillebrand named Molokai first (i.e., before Lanai) and cited his own specimens from Kalae, Wailau, and Mapulehu. A sheet of material from each of these three localities is extant in fine condition (Berl.). The Kalae specimens were collected in June, 1870.

Distribution: Eastern and north-central Molokai.

Specimens examined: *Otto Degener* 10,275, growing 5 feet tall, flowers orange, on sunny, shrub-covered, damp slope, west of Pepeopae, April 12, 1928 (Deg.; Field; staminate); *Degener* 10,276, east of Pepeopae, May 9, 1928 (Field; pistillate); *Degener* 10,281, Kaluaaha rain-forest, June 28, 1928 (Berl.; Deg.; Field; subflowering); *Charles N. Forbes* 138–*Mo*, mountains above Puu Kolekole, June, 1912 (Berl.; Bish.; Field; Kew; flowering); *Forbes* 168–*Mo*, same locality and date (Field; fruiting); *Forbes* 291–*Mo*, Pukoo, July, 1912 (Bish.; flowering); *Forbes* 332–*Mo*, Wailau Trail, August, 1912 (Bish.; Field; sterile); *William Hillebrand*, Hawaiian Isls. (Mus. V.; flowering); Hillebrand, Valley of Mapulehu (Berl.; Petrop.; flowering and fruiting); *Hillebrand*, Pali of Wailau (Berl.; sterile); *Hillebrand*, Kalae, June, 1870 (Berl.; type; flowering); *George C. Munro* 572, above Waikolu, June 5, 1916 (Bish.; flowering); *Joseph F. Rock* 7,044, alt. 3,000 feet, Pali of Wailau, April 15, 1910 (Bish.; subflowering); *Rock* 12,577, Mapulehu Mts., May 6, 1915 (Bish.; flowering); *Rock* 16,015, Kamoku, April, 1918 (Bish., 2 sheets; flowering); *Rock* 17,136, Mapulehu, Wailau Pali, May 6, 1915 (Bish., 2 sheets; flowering).

Labordia molokaiana var. γ **Munroi** Sherff, Amer. Journ. Bot. 25: 585. 1938; *Labordia lophocarpa* Hillebr. Fl. Haw. Isls. 289. 1888 (only as to Lanai specimens).

Ultimate branchlets densely aciculate-setulose on terminal few internodes. Leaves small, mostly narrow-obovate, apically short-acuminate, appressed-setose underneath; petiole broad or narrow, under 8 mm. long; blade 3.5–6 (rarely to 7.5) cm. long and 1–4 cm. wide. Inflorescence 1–3-flowered; corolla externally hispidulous, the tube often densely and conspicuously so.

Type specimen; Collected by *Dr. William Hillebrand*, Lanai, July, 1870 (Berl.).

Distribution: Mountains of eastern Lanai.

Specimens examined: *Charles N. Forbes* 27–*L*, mountains near Koele, June, 1913 (Bish.; flowering); *Forbes* 206–*L*, same locality and date (Bish.; Field; flowering); *Forbes* 242–*L*, mountains, east end of Lanai, June, 1913 (Bish.; flowering); *Hillebrand*, Lanai, July, 1870 (type, Berl.; fruiting); *George C. Munro* 229, Lanaihali, May 17, 1914 (Bish.; flowering); *Munro* 413, same locality and date (Bish.; flowering); *Munro* 449, ridge below Lanaihali, May 17, 1915 (Berl.; Bish.; Field; flowering).

The variety was named for Mr. George C. Munro, of the Island of Lanai, in grateful recognition of the valuable services he has performed for students of the Hawaiian flora by his numerous collections of Hawaiian plants.

Labordia molokaiana var. δ **phyllocalyx** (Hillebr.) Sherff, Amer. Journ. Bot. 25: 585. 1938; *Labordia waiolanii* Wawra, Flora 55: 516. 1872 (and Skottsberg, Meddel. Göteborgs Bot. Trädgård 10: 154, *fig. 18*. 1936); *Labordia lophocarpa* var. *phyllocalyx* Hillebr. Fl. Haw. Isls. 290. 1888.

Small, sparingly branched shrub, branchlets commonly glabrous or glabrate to end. Stipules broad-auricular, distinct. Leaves succulent when fresh, membranaceous when dry, subsessile; petiole 2–4 mm. long; blade variously obovate to elliptic or oblanceolate, at apex moderately or sometimes very acuminate, below middle usually narrowed to an acute base, glabrous or sometimes very sparsely setose or papillate-hirtellous beneath, 4–6 (rarely to 7.5) cm. long and 1.5–3 cm. wide. Cyme 1–3-flowered, pedicels very short or up to 8 mm. or finally often 1.5 cm. long, glabrous or at first sparsely setulose. Sepals large, foliaceous, thick, stipitate at base, the 3 outer ones cordate-ovate, short-acuminate, 2–3.2 cm. long and 1.3–2 cm. wide; the two inner ones ovate-lanceolate, ±2 cm. long and about 7–10 mm. wide. Corolla ±2.5 cm. long; tube ±13 mm. long, thin below but fleshy above, sparsely pubescent

outside, slightly hairy above on inside; lobes spreading, fleshy, hirsute except toward apex, ±12 mm. long and ±5 mm. wide. Anthers of fertile flowers linear-sagittate, mucronulate, 2.5–2.7 mm. long (including mucro of 0.5 mm.) and 0.6 mm. wide, sterile; or at times apparently lacking. Pistil ±1.4 cm. long; ovary ovoid-cylindric from truncate base, glabrous, trisulcate, trimerous, 7–8 mm. long and 3 mm. wide; style almost lacking, stigmas 3, erect, 6 mm. long and 1.5 mm. wide, canaliculate. Sterile flowers not seen. Capsule about 15 mm. tall (or about 12 mm. excluding the crested, valvular keels); pulp orange-colored when fresh.

Type specimen: Collected by *Dr. William Hillebrand*, western ridge of Nuuanu, Oahu, December, 1869 (Berl.).

Distribution: Southeastern and northeastern Oahu.

Specimens examined: *Otto Degener* (field no. 302), Oahu, July 29, 1935 (Berl.; Deg.; Field; flowering and fruiting); *Degener & Emilio Ordoñez* 12,062, in rain-swept, shrubby place, along C. C. C. Trail, Kawailoa, July 3, 1938 (Berl.; Field; subflowering); *Degener & Ordoñez* 12,063, on rain-swept, shrubby summit, same locality and date (Deg.; Field; pistillate); *Degener, Park, Bush, & Potter* 10,151, in rain-forest, west of Poamoho Trail, Laie, August 25, 1935 (Field; subfruiting); *Degener, Park, Bush, Potter, & Topping* 10,120 *pro parte*, a slender tree 12 feet tall, in forest, Anahulu Trail, Koolau Range, June 16, 1935 (Field, 2 sheets; *cum L. Fagraeoidea var. septentrionali commixt.*); *Degener, Salucop, & Arlantico* 11,568, tree 5–8 feet tall, in forest, alt. 3,000 feet, southeast slope of Puu Kaala, December 19, 1937 (Berl.; Deg.; Field; fruiting); *Francis R. Fosberg* 9,738, flowers deep yellow, on wooded ridge, alt. 850 meters, Kipapa Gulch, Waipio, August 6, 1933 (Field; subflowering); *Hillebrand*, western ridge of Nuuanu, December, 1869 (type, Berl.: cotype, U. S.; fruiting); *E. Y. Hosaka* 678, tree 10 feet tall, on denuded ridge, alt. 2,500 feet, south ridge, Kipapa Gulch, Waipio, Koolau Mts., July 4, 1932 (Bish.; pistillate); *Rock & Shaw*, Konahuanui, September, 1912 (Bish.; flowering); *Carl Skottsberg* 1,850, alt. about 750 meters, Koolau Range, high ridge above Kahana, September 17, 1926 (Bish.; Goth.; pistillate); *Michio Yamaguchi* 1,256 *pro parte*, alt. 2,700 feet, south ridge, Kipapa Gulch, Waipio, Koolau Range, July 4, 1932 (Bish.; Field; subflowering; *cum L. Fagraeoidea var. conferta commixt.*).

Joseph F. Rock made a study of *Labordia molokaiana* Baill. and *L. waiolanii* Wawra in 1914. Under date of April 6th of that year he wrote a label at Berlin (for the Rock & Shaw specimen now at

Bishop Museum), transferring *L. waiolanii* to varietal status under *L. molokaiana*. Rock's interpretation of *L. waiolanii* appears to be the only logical one, but under the International Rules the name *phyllocalyx*, which is synonymous with *waiolanii*, must be adopted.

Hillebrand (Fl. Haw. Isls. 290. 1888), clearly by way of mere speculation and without Wawra's material at hand, reduced *L. waiolanii* Wawra to synonymy with *L. Fagraeoidea* Gaud., although he had previously stated his own var. *phyllocalyx* to be "possibly Wawra's *L. Waiolanii* on the improbable assumption that the foliaceous sepals had been mistaken for a 'rosette of leaves.' " Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 155. 1936) reports having "examined *Wawra's* type which shows that *Hillebrand's* assumption, though improbable, was correct." Skottsberg maintains *L. waiolanii* as a species and to it refers his own no. 1850, a plant which matches the type of Hillebrand's var. *phyllocalyx*.

Labordia molokaiana var. ε **congesta** Degener & Sherff *ex* Sherff, Amer. Journ. Bot. 25: 585. 1938.

Branchlets often tetragonal, even subalate at the angles. Leaves numerous and crowded together, pallid, shortly petiolate, petiole 2–6 mm. long; blade oblong-ovate or at times obovate, at apex acute but hardly acuminate, glabrous, 2–6 cm. long and 1–3 cm. wide. Exterior sepals broadly ovate, at base more or less auriculate-cordate and broadly substipitate, dorsally glabrate, more often 1–1.5 cm. long. Bractlets spatulate. Corolla 1.3–1.5 cm. long, externally more or less pubescent, internally white-setose, tube ±7.5 mm. long, lobes oblong-linear.

Type specimen: Collected by *Otto Degener*, no. 10,278, head of Waihanau Stream, Molokai, May 23, 1928 (Field).

Distribution: Northeastern Molokai.

Specimens examined: *Degener* 10,278 (type, Field: cotypes, Berl.; Deg.; Gray; pistillate); *Degener* 10,279, near Lalanui, May 18, 1928 (Berl.; Deg.; Field; Gray; flowering).

This and var. *setosa* may be distinguished from *L. molokaiana* proper and its other varieties by their numerous, small, pale leaves, these much crowded toward the ends of the subalately tetragonal branchlets. The two varieties are too closely alike in foliage apparently to be recognized with certainty unless calyces are present.

Labordia molokaiana var. ζ **setosa** Degener & Sherff *ex* Sherff, Amer. Journ. Bot. 25: 585. 1938.

Strongly similar to var. *congesta* but differing at least in its sepals; these obovate, subgradually narrowed toward base (scarcely cordate or auriculate), on dorsal surface (below very densely, above moderately or sparsely) antrorse-hispid with brownish hairs, a little larger than in var. *congesta*.

Type specimen: Collected by *Otto Degener*, no. 10,282, in tapestry forest near top, west side of Waikolu Valley, Molokai, April 21, 1928 (Field).

Distribution: Known only from type locality in northeastern Molokai.

Specimens examined: *Degener* 10,282 (type, Field: cotypes, Berl.; Brit.; Field, 2 sheets; Gray; Kew; Par.; U. S.; flowering).

Labordia molokaiana var. η **Bryanii** Sherff, Amer. Journ. Bot. 25: 585. 1938.

Branchlets weakly or almost tetragonal, glabrous. Petioles 1–8 mm. long; blades oblanceolate, at apex clearly acuminate, at base gradually narrowed, glabrous on upper surface, moderately appressed-hispid beneath. Inflorescence more often 3-flowered. Calyx subsessile or finally short-pedicelled; sepals broadly ovate, lengthwise 5–9-nerved, on dorsal surface densely or at last moderately or even subsparsely hispid, 1.5–2.5 cm. long. Capsule about 1.8 cm. tall including the conspicuous crests.

Type specimen: Collected by *Francis Raymond Fosberg*, no. 10,965, bush 2 meters tall, flowers orange-yellow, leaves pale beneath, on wet, brushy ridge, alt. 880 meters, main divide north of Palikea, Waianae Mts., Honouliuli, Oahu, June 30, 1935 (Bish.).

Distribution: Waianae Mts., Oahu.

Specimens examined: *Fosberg* 10,965 (type, Bish.: cotype, Field; flowering); *Edward P. Hume* 42, near spring, on wet, steep slope, alt. 3,800 feet, Kaala, Waianaeuka, November 31, 1930 (Bish.; fruiting); *Olof H. Selling* 3,954, Waianae, Kaala, September 25, 1938 (Goth.; pistillate); *Harold St. John* 12,214, shrub 15 feet tall, moist woods near summit, alt. 3,050 feet, Puu Kaua, Honouliuli, November 6, 1932 (Berl.; Bish.; Field; fruiting); *D. LeRoy Topping* (*Otto Degener* distrib.) 2,859, Kalena, September 14, 1924 (Deg.; Field; flowering).

Named for Mr. Edwin H. Bryan, Jr., Curator of Collections at the Bernice P. Bishop Museum, to whom I was indebted for the lending of the first three collections cited, as well as of much other material from the Bishop Museum.

2. **Labordia Fagraeoidea** Gaud. Bot. Freyc. Voy. 450, *pl. 60.* 1830.[1]

a. Calyx lobes mostly lanceolate to oblong-lanceolate or oblong-linear.

b. Distal one or more internodes of branchlets hispid.

c. Distal one or two internodes moderately hispid; sepals glabrous or glabrate, about twice as long as corolla-tube.
var. *θ longisepala.*

c. Distal few internodes densely hispid; sepals dorsally pubescent, equaling or shorter than corolla-tube . . . var. *ε sessilis.*

b. Distal internodes of branchlets glabrous or glabrate.

c. Calyx externally hispid at least on lower half.

d. Leaves membranaceous . . . . . var. *ζ waianaeana.*

d. Leaves coriaceous . . . . . var. *κ Hillebrandii.*

c. Calyx externally glabrous or at most with a few scattered setae near base.

d. Inflorescence usually teratological and abortive, leaves commonly elongate . . . . . var. *ε sessilis* f. 1. *glabrescens.*

d. Inflorescence normal and productive.

e. Branchlets more or less terete; principal leaves oblong or oblong-ovate or -obovate, about 3–4 cm. wide, moderately appressed-hispid along veins on lower surface.
L. Fagraeoidea sensu stricto.

e. Branchlets terete to obscurely tetragonal; principal leaves oblong-fusiform in outline or narrowly obovate, 2.5–3.5 cm. wide, glabrous beneath.
var. *ι septentrionalis.*

e. Branchlets angular; principal leaves spatulate-oblanceolate, about 2–3 cm. wide, the veins on lower surface glabrous or at most very remotely setose.
var. *δ jugorum.*

a. Calyx lobes (especially outer ones) ovate or broader.

b. Leaves mostly sessile, glabrous . . . . . var. *γ conferta.*

b. Leaves mostly slender-petioled, often slightly hispid beneath.

c. Calyx strongly hispid at least below middle.

d. Leaves membranaceous . . . . . var. *η Saint-Johniana.*

[1] In Gaudichaud's text proper, the trivial name was misprinted *fragraeoidea.* It was printed correctly as *fagraeoidea,* however, in the title to the illustrative plate (no. 60). The foliar habit resembles strikingly that of *Fagraea.*

d. Leaves coriaceous.....var. κ *Hillebrandii.*

c. Calyx glabrous or very sparsely setose.

d. Inflorescence sessile, contracted and more or less umbellate.

e. Sepals up to 1.2 cm. wide, dorsally glabrous or sparsely setose below; leaves mostly narrow-obovate; plant of Waianae Range, Oahu.

var. κ *Hillebrandii* f. 1. *subcalva.*

e. Sepals mostly 5–7 mm. wide, dorsally more or less setose; leaves mostly oblong-fusiform; plant of Koolau Range, Oahu.....var. λ *simulans.*

e. Sepals mostly 2–4 mm. wide, glabrous...var. β *Humei.*

d. Inflorescence pedunculate, open and paniculate.

var. β *Humei* f. 1. *paniculata.*

Shrub, branchlets terete or (because of decurrent leaf-petioles) angulate, somewhat appressed-hispid at nodes of younger portion, elsewhere glabrous. Leaves subsessile or petiolate; petiole sparsely hispidulous, 5–10 mm. long; blade oblong or oblongly ovate or obovate, at apex obtuse or more often moderately and subabruptly acuminate, at base widely cuneate, subcoriaceous, pinnately nerved (principal lateral nerves more often 10–12 to each side), very glabrous above, on lower surface along the nerves moderately elsewhere sparsely appressed-hispid with arcuate and sharp setae, very thinly hyaline and weakly revolute at the eciliate margin, for the principal leaves about 7–8 cm. long and about 3–4 cm. wide. Stipules dorsally adnate to base of petioles, connate or distinct, broadly indurate-margined and entire at top, about 3–4 mm. tall. Flowers few (±5) in a contracted, umbellate inflorescence. Calyx yellowish-green, 7–10 mm. tall; sepals 3- or 5-nerved, lanceolate or oblong-linear, delicately hyaline-margined, essentially glabrous, distinct nearly or quite to base, somewhat unequal in length, 1–2.5 mm. wide. Corolla yellowish-white, tubular-infundibuliform, ventricose at base, tube barely equaling the calyx; lobes lanceolate, spreading, somewhat villous on inner surface, ±6 mm. long. Pedicel slender, glabrous or essentially so, ±6 mm. long, bibracteolate at or near middle with extremely filiform, parallel-sided, glabrous bracteoles, these about 5 mm. long. Ovary ovate, trigonous, trilocular. Style short, thick, triangular. Stigma conic, triangular, pubescent. Mature capsule unknown.

Type specimen: Collected by *Charles Gaudichaud,* alt. 2,700–3,000 feet, Oahu, 1819. Represented by the original plate (Gaud., loc. cit.). The Museum of Natural History at Paris seems not to possess an

authentic specimen among its Gaudichaud material. Fortunately, however, the Berlin Botanical Garden has, in a good state of preservation, an original specimen which Gaudichaud himself presented to Kunth in 1829. This is clearly from the type material, but the leaves (as can be seen in the photograph taken by me) are mostly a trifle broader toward the base than shown by the artist in the type illustration.

Distribution: Known only from Oahu. Hillebrand (Fl. Haw. Isls. 290. 1888) states that Gaudichaud probably collected his type in Nuuanu, southeastern Oahu.

Specimens examined: *Degener, Park, Potter, & Bush* 10,152, windswept summit, Kipapa Trail, Koolau Range, Oahu, June 2, 1935 (Field; staminate); *Gaudichaud*, alt. 2,700–3,000 feet, Oahu, 1819 (type material, Berl.; pistillate).

A species to which several other forms have been referred erroneously by various writers. I can find no specimens collected since Gaudichaud's time, except the lone Degener *et al.* plant, that match the type material. My description is in part borrowed from Gaudichaud's original text and illustration and in part taken from the single Gaudichaud specimen examined. It will be noted that Gaudichaud's description of this species as a "frutex glaber" is hardly accurate, since the lower leaf-surfaces and nodes of the young branchlets are more or less hispid. The Degener *et al.* plant, however, has these parts glabrous but possesses the slightest traces of hispidity on certain distal internodes.

Labordia Fagraeoidea var. *β Humei* Sherff, Amer. Journ. Bot. 25: 585. 1938.

Shrub ±3 meters tall; branchlets angulate, glabrous, at tips moderately or abundantly foliose. Leaves smaller and narrower; blade (often subrhomboidally or oblongly) oblanceolate, often narrowed slender-cuneately below the middle all the way to the base, coriaceous, glabrous or upon the more pallid lower surface often sparsely appressed-setulose, commonly 4–7 (more rarely –9.5) cm. long and 1–2.5 (more rarely –3) cm. wide; principal lateral nerves only about 7 or 8 to each side. Inflorescence sessile, umbellate, 2–5-flowered; bractlets of pedicels 2 or often only 1. Calyx lobes ovate or cordate-ovate, 2–6 mm. wide, glabrous, at apex acute or mucronate. Corolla fleshy, intensely yellow; lobes lanceolate-linear, spreading, internally white-setulose (especially below), at apex sharp, 7–12 mm. long; tube not surpassing the sepals, now glabrous now

(more rarely) conspicuously and retrorsely white-setose. Capsule 3-valvate, glabrous, 1–1.2 (even 1.8–2.1) cm. long, globose-ovoid (or truly ovoid or obovoid); valves medianly carinate toward apex, moderately rostrate.

Type specimen: Collected by *Charles N. Forbes* (with *Mr. Labouchere*), no. 2,288–*O*, Kalihi Pali, Oahu, February 16, 1916 (Bish.).

Distribution: Along Koolau Range, Oahu.

Specimens examined: *H. F. Bergman*, alt. 1,700 feet, on slopes of Keeaumakua, February 22, 1928 (Bish.); *Otto Degener*, Oahu, July 29, 1935 (Field; staminate); *Degener, Martinez, & Salucop* 11,124, in rain-forest, Pig-God Trail, Punaluu, March 29, 1937 (Berl.; Brit.; Del.; Field, 2 sheets; Gray; Kew; Mo.; Mun.; Mus. V.; N.Y.; Par.; U.S.; variously staminate and fruiting); *Degener, Kwan Park, & Y. Nitta* 10,234, Pig-God Trail, in forest halfway to summit, Punaluu, June 22, 1932 (Berl.; Deg.; Field; Gray; Kew; Par.; partly typical and with mature fruits, partly teratological with monstrous ovate sepals 1–2 cm. long, these resembling those of *L. molokaiana* var. *phyllocalyx*); *Degener, Park, & Nitta* 10,235, in summit rain-forest, Pig-God Trail, Punaluu, June 22, 1932 (Berl.; Deg.; Field; fruiting); *Degener, Park, & Manuel Kwon* 10,238, in forest halfway to summit, Pig-God Trail, Punaluu, January 17, 1932 (Berl.; Deg.; Field; staminate); *Charles N. Forbes* (with *Dean Lake*) 1,980–*O*, Waimanu (Waimano) Ridge, October 27–30, 1914 (Bish.; sterile); *Forbes* 2,288–*O* (type, Bish.: cotypes, Berl.; Field; staminate); *Forbes & C. L. Thompson*, Koolau Mts. between Punaluu and Kaipapau, May 8–13, 1909 (Field; staminate); *Francis R. Fosberg* 10,896, corolla fleshy, deep chrome-yellow, leaves coriaceous, very pallid beneath, veins pellucid, on steep, bushy slope, alt. 740 meters, Waikane-Schofield Trail, Koolau Mts., Kahana, May 12, 1935 (Field; staminate); *F. R. & V. O. Fosberg* 13,736, shrub 3 meters tall, leaves thick, pallid beneath, veins pellucid, flowers fleshy, orange-yellow, in wet forest, alt. 650 meters, Castle Trail, Punaluu Valley, Koolau Mts., April 25, 1937 (Bish.; Field; staminate); *F. R. Fosberg & E. Y. Hosaka* 13,979, shrub 0.4 meter tall, leaves pallid beneath, main veins pellucid, corolla fleshy, orange-yellow, in small, open bog, alt. 825 meters, above Kaipapau Gulch, crest of Koolau Mts., May 31, 1937 (Field; staminate); *Edward P. Hume* 79, steep slope near top, alt. 600 meters, Punaluu, January 11, 1931 (Bish.; one of two corollas with tube conspicuously and retrorsely white-hispid outside; pistillate); *Hume* 439, shrub, alt. 1,800 feet, on side of wooded hill, Punaluu, Punaluu-Kaluanui Divide, December 21, 1931 (Bish.;

subflowering); *Harold St. John* 10,074, shrub, alt. 1,800 feet, Punaluu, November 30, 1929 (Berl.; Bish.; Field; staminate).

Easily distinguished from the species proper by its narrower, usually much smaller, basally more narrowly cuneate, apically more gradually narrowed leaves, these with fewer lateral nerves and the lower surface much less hispid or even glabrate. The sepals, too, are much broader proportionately and more ovate than in the species itself. The fruiting specimens examined have capsules mostly 1–1.2 cm. long, but a few capsules are found much longer. One collection (Degener *et al.* 11124) has, in addition to numerous small, mature capsules, a very few large, smooth, unmatured ones, ranging up to 2.1 cm. long, exclusive of the stylar rudiment (this about 4 mm. long).

Labordia Fagraeoidea var. β **Humei** f. 1. **paniculata** Sherff, Amer. Journ. Bot. 25: 586. 1938.

Inflorescence commonly 5- or 7-flowered, shortly pedunculate with a peduncle up to 6 mm. long, paniculate, ±2 cm. tall and ±3 cm. wide, branchlets (or pedicels) more or less opposite. Flowers a little smaller. Bractlets of pedicels more often only one.

Type specimen: Collected by *Charles N. Forbes*, no. 1,440–*O*, on ridge, east Nuuanu Valley, February 8, 1910 (Bish.).

Distribution: Southeastern Oahu.

Specimens examined: *Forbes* 1,440–*O* (type, Bish.: cotypes, Berl.; Field; Mo.; staminate).

The leaf-blades on the few specimens seen are mostly 2–5 cm. long. However, in the variety proper some material is found with leaf-blades averaging as small. Thus the paniculate, more numerously flowered, pedunculate inflorescence offers the only distinction. In view of the remarkably close resemblance in numerous other respects to specimens of the variety proper, collected in the same vicinity, this distinction would seem best considered as connoting a forma.

Labordia Fagraeoidea var. γ **conferta** Sherff, Amer. Journ. Bot. 25: 586. 1938.

Shrub ±1.5 meters tall; branchlets glabrous, sharply angulate (because of decurrent petioles). Leaves crowded near tips of branchlets, pallid, rarely subsessile commonly sessile, narrowly obovate or oblong-oblanceolate, at apex moderately acuminate, very glabrous; principal lateral nerves commonly 6–8 to each side. Inflorescence sessile, 3–5-flowered. Sepals ovate or widely oblong, normally 2–4.5 mm. wide (often monstrous and much larger). Corolla about 10–12 mm. long. Capsule 1.3 cm. long.

Type specimen: Collected by *Francis R. Fosberg* and *Edward Y. Hosaka*, no. 13,922, shrub 1.5 meters tall, leaves pallid beneath, main veins pellucid, on wet, brushy, windswept ridge, alt. 830 meters, crest of Koolau Mts., between Waikane Valley and Waikakalaua Gulch, May 30 and 31, 1937 (Field).

Distribution: In eastern Oahu.

Specimens examined: *Degener, Park, & Wallace Hirai* 10,237, in rain-forest, Waikane-Schofield Trail, April 4, 1931 (Deg.; Field; staminate); *Francis R. Fosberg* 8,714, bush 2 meters tall, in scrubby, wet forest, alt. 900 meters, summit of Koolau Mts., above Kipapa Gulch, Waipio, September 18, 1932 (Field; fruiting); *Fosberg* 10,896, corolla fleshy, deep chrome-yellow, leaves coriaceous, very pallid beneath, veins pellucid, on steep, brushy slope, alt. 740 meters, Waikane-Schofield Trail, Koolau Mts., Kahana, May 12, 1935 (Bish.; pistillate); *Fosberg & Edward Y. Hosaka* 13,922 (type, Field; subfruiting); *Hosaka* 946, shrub 4 feet tall, alt. 2,000 feet, on wet, denuded ridge, south ridge of Kipapa Gulch, Koolau Mts., March 19, 1933 (Bish.; Field; Par.; staminate); *Hosaka* 968, same locality, April 16, 1933 (Bish.; Field; staminate); *Hosaka* 2,033, shrub 3 feet tall, petals dark yellow, tube of corolla light yellow, common, on moist, wooded slope, alt. 2,000 feet, Waimano, Ewa Forest Reserve, Koolau Range, May 8, 1938 (Berl.; Bish.; Del.; Field; pistillate); *Hosaka* 2,034, same data (Bish.; Field; subflowering, pistillate); *Michio Yamaguchi* 1,256 *pro parte*, alt. 2,700 feet, same locality, July 4, 1932 (Bish.; Field; subflowering; *cum L. molokaiana var. phyllocalyce commixt.*). Several additional specimens have recently come to hand, but too late to include here.

The pale, terminally numerous leaves of the type offer an illusory resemblance to those of certain varieties (e.g., var. *moomomiana*) of *Euphorbia Celastroides* Boiss. The other cited material is more scraggly, has its fewer and somewhat smaller (1.5–4.5 cm. long) leaves more localized in almost rosette-like terminal clusters, and has either flowers in anthesis or (*Fosberg* 8,714) matured capsules, but in technical characters and from geographic and ecological considerations appears to be identical.

Labordia Fagraeoidea var. δ **jugorum** Sherff, Amer. Journ. Bot. 25: 587. 1938.

Branchlets angulate (because of decurrent leaves), glabrous. Leaves sessile or more rarely petiolate with petiole up to 1 cm. long, spatulate-oblanceolate, glabrous or very remotely setose on lower

surface, gradually cuneate-narrowed below to base or petiole, at apex acuminate, principal ones often 7–10 cm. long and 2–3 cm. wide. Inflorescence sessile, contracted, 3–7-flowered, glabrous. Calyx about 7–10 mm. long, glabrous, sepals more often lanceolate and apically sharp. Corolla about 2 cm. long.

Type specimen: Collected by *Charles N. Forbes* (with *Dr. C. Montague Cooke*), Koolau Mts., between Punaluu and Kaipapau, Oahu, May 3–8, 1909 (Bish.).

Distribution: On ridges (whence the varietal name) and perhaps elsewhere, in the Koolau Range, Oahu.

Specimens examined: *Charles N. Forbes* 2,208–*O*, Wahiawa-Kahana Trail, August 17–20, 1915 (Bish.; pistillate); *Forbes* 2,552–*O*, Konahuanui ridges, March 17, 1919 (Bish.; staminate); *Forbes* (with *C. M. Cooke*), Koolau Mts., between Punaluu and Kaipapau, May 3–8, 1909 (type, Bish.; staminate).

Labordia Fagraeoidea var. ϵ **sessilis** (A. Gray) Sherff, Amer. Journ. Bot. 25: 587. 1938; *Labordia sessilis* A. Gray, Proc. Amer. Acad. 4: 323. 1860.

Branchlets densely papillate-hispid on younger portions, the hairs more or less brownish. Leaves subsessile or shortly petiolate with petioles to about 8 mm. long, diverse in shape but mostly rather widely oblanceolate, normally under 8 cm. long and 3.5 cm. wide but (on sterile or teratological specimens) frequently up to 1.5 dm. long and to 4.5 cm. wide, usually more or less brown-hispid underneath especially along the larger veins. Sepals oblong-lanceolate, acute at apex, distinctly 3–7-nerved, externally hispid, now small (7–12 mm. long) now large (10–18 mm. long). Corolla 2–2.5 cm. long. Capsule shortly pedicellate, 3-valved; valves ±1.4 cm. long, carinate at top; persistent stylar beak slender, about 3 mm. long.

Type specimen: Collected by the *United States Exploring Expedition under Captain Wilkes*, Oahu, 1840 (U. S.).

Distribution: Koolau Range, Oahu.

Specimens examined: *Degener, Salucop, & Arlantico* 11,550, shrub 2–3 feet tall, on wind- and rain-swept summit, C.C.C. Trail, Aiea, December 6, 1937 (Berl.; Deg.; Field, 2 sheets; mostly sterile or abortive); *Degener, Salucop, & Arlantico* 11,552, same locality and date (Berl.; Deg.; Field; sterile); *Francis R. Fosberg* 8,698, bush 2 meters tall, in rain-forest, alt. 850 meters, on south ridge of Kipapa Gulch, Koolau Mts., Waipio, September 18, 1932 (Field; vegetative);

Fosberg 8,699, bush 1.5 meters tall, alt. 900 meters, in scrubby rain-forest, head of Kipapa Gulch, summit of Koolau Mts., Waipio, September 18, 1932 (Bish.; Field; mature capsules 7–9 mm. tall); *Fosberg* 8,714, bush 2 meters tall, in scrubby, wet forest, alt. 900 meters, summit of Koolau Mts., above Kipapa Gulch, Waipio, September 18, 1932 (Bish.; mature capsules about 8 mm. tall); *Fosberg* 9,723, bush 2 meters tall, flowers yellow, leaves pale underneath, alt. 850 meters, on wooded ridge, Kipapa Gulch, Waipio, August 6, 1933 (Bish.; Field; sterile or abortive); *Fosberg* 9,725, shrub 1 meter tall, flowers yellow, alt. 860 meters, exposed ridge, Kipapa Gulch, Waipio, August 6, 1933 (Bish.; Field; staminate); *Fosberg* 9,741, bush 1–2 meters tall, flowers yellow, alt. 860 meters, same locality and date (Bish.; Field; abortive-flowering); *Fosberg* 13,860, shrub 0.2–0.5 meter tall, leaves white beneath, veins pellucid, flowers orange, fleshy, alt. 730 meters, on wet, brushy, windswept ridge, top of cliffs at head of Haiku Valley, main divide of Koolau Mts., Heeia, May 23, 1937 (Bish.; Field; pistillate); *Fosberg & E. Y. Hosaka* (see also *Hosaka & Fosberg*) 13,914, shrub 3 meters tall, leaves pallid beneath, veins pellucid, flowers orange-yellow, alt. 860 meters, in wet forest, main divide, crest of Koolau Mts., between Waianu Gulch and Kipapa Gulch, May 30 and 31, 1937 (Bish.; Field; staminate); *Fosberg & Hosaka* 13,917, tree 5 meters tall, leaf-veins pellucid, flowers yellow, alt. 850 meters, in wet forest, same locality and date (Bish.; Field; staminate but somewhat abortive); *Fosberg & Hosaka* 13,919, shrub 1 meter tall, leaves dark green above, lighter beneath, flowers orange-yellow, on wet, turfy slope, alt. 800 meters, main divide, crest of Koolau Mts., between Uwau Gulch and Kipapa Gulch, May 30 and 31, 1937 (Bish.; Field; pistillate); *Fosberg & Hosaka* 13,921, shrub 1 meter tall, veins pellucid, flowers orange-yellow, alt. 820 meters, on wet, steep, turfy slope, same locality and dates (Bish.; Field; staminate); William Hillebrand, Hawaiian Isls. (U. S.; fragment); *Hillebrand*, Wailupe (Berl.; staminate); *Hillebrand*, peak of Waipahia, Nuuanu (Berl.; Kew; staminate); *Hillebrand & Lydgate*, Oahu (Bish.; fragment); *Edward Y. Hosaka* 598, bush 5 feet tall, on wet, denuded ridge, south ridge, Kipapa Gulch, Waipio, Koolau Mts., July 4, 1932 (Bish.; Field; staminate); *Hosaka* 679, shrub 4 feet tall, alt. 2,500 feet, on denuded ridge, same locality and date (Bish.; Field; apparently teratological); *Hosaka* 1,139, shrub 4 feet tall, alt. 2,500 feet, on denuded ridge, Kipapa Gulch, Koolau Mts., August 6, 1933 (Berl.; Bish.; Field; staminate but partly abortive); *Hosaka* 1,195, on wet

slope, alt. 1,800 feet, Kipapa Gulch, Koolau Mts., Waipio, August 7, 1933 (Bish.; Field; Gray; Kew; abortive); *Hosaka & Fosberg* (see also *Fosberg & Hosaka*) 1,875, bush 5 feet tall, occasional on wet, wooded slope, alt. 2,600 feet, divide between head of Kipapa and Uwau Gulches, Koolau Range, May 30, 1937 (Bish.; pistillate); *Hosaka & Fosberg* 1,880, bush 4 feet tall, alt. 2,700 feet, on wooded slope below ridge, divide between head of Waikane and Waikakalaua Gulches, Koolau Range, May 30, 1937 (Bish.; Field; staminate but mostly abortive); *Hosaka & Fosberg* 1,881, bush 6 feet tall, occasional on wet, wooded slope, alt. 2,600 feet, same locality and date (Bish.; Field; staminate); *Horace Mann & William T. Brigham*, Oahu (Corn.; staminate); *Jules Remy* 343*bis*, mountains of Oahu, April, 1855 (Par.; subflowering); *O. H. Swezey*, Lanihuli, June, 1919 (Bish.; staminate); *U. S. Explor. Exped. under Capt. Wilkes*, Oahu, 1840 (type, U. S.: cotype, Gray; fruiting).

Until now *Labordia sessilis* A. Gray has been more or less enigmatic with botanists. Horace Mann (Proc. Amer. Acad. 7: 196. 1867) reduced it to *L. Fagraeoidea* Gaud. Hillebrand (Fl. Haw. Isls. 290. 1888) modified Gaudichaud's description of *L. Fagraeoidea* to read, "generally glabrous, but sometimes the young shoots and inflorescence coarsely pubescent," and then likewise reduced *L. sessilis* to *L. Fagraeoidea.*

Rock (Indig. Trees Haw. Isls. 406. 1913) maintained *L. sessilis* as a valid species "certainly distinct from *L. Fagraeoidea,*" but from Rock's text it is evident that he lacked a clear notion of what the genuine *L. sessilis* really was. Thus his opinion is of little value to us here. Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 163. 1936) has recently made a critical study of the two original specimens studied by Gray and refrains from attempting a definite disposition of them. He writes of *L. sessilis* Gray: "Possibly it belongs in the vicinity of *L. Fagraeoidea.*"

Fortunately, I have been able to examine much illustrative material collected the past few years on Oahu by Degener, Fosberg, Hosaka, Swezey, and others, and have been able to reach a satisfactory understanding of Gray's type specimens. These latter were of two kinds. One had moderately small, widely oblanceolate leaves and mature capsules 1.2–1.5 cm. long, capped by a slender stylar beak about 3 mm. long. The other was a sterile shoot with gigantic, oblanceolate leaves, these up to about 15.5 cm. long and to over 4 cm. wide. On both, but conspicuously so on the sterile one, the distal internodes and the under surfaces of the leaves' veins

were densely brown-hispid. There seems no question that the sterile shoot (which, together with the other type material and numerous connecting specimens, lies before me) is merely a more or less abnormal, perhaps teratological representative of the smaller-leaved fruiting form. Various collectors have distributed the two forms under the same number and doubtless in many instances had collected them from the same bush or tree. Invariably, sprays with elongate leaves are found to lack flowers and fruits, or at most to have abortive and *mutually* more or less diverse flowers. At times the flowers are especially abortive and numerous.

Compared with typical *L. Fagraeoidea*, the smaller-leaved sprays are found to differ chiefly in having the distal few internodes of the branchlets densely hispid, the leaves perhaps narrower and more oblanceolate, and the sepals sharper-pointed and more slender. *L. sessilis* is seen at once to be of co-ordinate rank with vars. *Humei* and *conferta* under *L. Fagraeoidea*, to a variety of which it must therefore be reduced.

Labordia Fagraeoidea var. ε **sessilis** f. 1. **glabrescens**, f. nov.

Ramuli apices versus non vel aegre hispiduli; foliis subtus normaliter sparsim adpresso-hispidis.

Branchlets glabrous or only weakly hispidulous along terminal internodes; leaves usually appressed-hispid beneath with scattered hairs.

Type specimen: Collected by *Edward P. Hume*, no. 556, shrub, alt. 1,700 feet, by stream, Kaluanui Valley, Oahu, May 8, 1932 (Bish.).

Distribution: Along the Koolau Range of Oahu.

Specimens examined: *Otto Degener & Emilio Ordoñez* 12,059, wide bush 3 feet tall, on rain-swept shrubby summit, C.C.C. Trail, Kawailoa, July 3, 1938 (Berl.; Deg.; Field; abortive-flowering); *Degener & Ordoñez* 12,061, on wind-swept shrubby summit, same locality and date (Deg.; Field; abortive-flowering); *Degener, Park, Bush, Potter, & Topping* 10,121, shrub in rain-forest, Anahulu Trail, Koolau Range, June 16, 1935 (Berl.; Deg.; Field; pistillate); *Otto Degener, Kwan Kee Park, & Y. Nitta* 10,334, on rain-swept summit, along Pig-God Trail, Punaluu, June 22, 1932 (Berl.; Field; abortive-flowering); *Degener, Park, & Nitta* 10,335, same locality and date (Berl.; Deg.; Field, 2 sheets; staminate but abortive); *Francis R. Fosberg* 12,249, shrub 1 meter tall, leaves pallid beneath, veins pellucid, flowers deep chrome yellow, on wet, steep, exposed, brushy slope, alt. 750 meters, Waikane-Schofield Trail, Koolau Mts.,

Kahana, July 27, 1935 (Bish.; Field; abortive-flowering); *Hosaka & Fosberg* 1,871, bush 5 feet tall, occasional on wet, wooded slope, alt. 2,650 feet, divide between head of Kipapa and Waianu Gulches, May 30, 1937 (Bish.; subflowering); *Hosaka & Fosberg* 1,918, bush 5 feet tall, occasional on wooded slope, alt. 2,300 feet, Puu Kainapuaa, Koolau Range, May 31, 1937 (Bish.; Field; abortive-flowering); *Hume* 556 (type, Bish.: cotype, Field; pistillate); *Charles Judd* (*Otto Degener* distrib. no.) 10,116, in rain-forest, Konahuanui, December, 1935 (Field; sterile).

This form seems particularly susceptible to insect or fungus attack in its branch tips. The result is often an extremely teratological appearance of the apical portions. The flowers in such cases are often very numerous (even forty or more) in a more or less spicate umbel, and are either abortive or fairly normal but smaller than in average specimens of the variety proper. The glabrescent nature of the branchlets in their distal portions might seem in the description to imply a closer affinity with the species proper, but the various specimens examined appear on careful comparison to have leaves more as in var. *sessilis*. A comparative field-study of *L. Fagraeoidea* proper, var. *sessilis* proper, and forma *glabrescens* is much to be desired, with special regard to their natural affinities as shown by calyces in normally (that is, not teratologically) developed material. In var. *sessilis* proper the sepals seem to be more often narrow, sharp at apex, and almost or quite glabrous. However, some material shows sepals mostly oblong or mostly pubescent or both.

Labordia Fagraeoidea var. ζ **waianaeana** Sherff, Amer. Journ. Bot. 25: 587. 1938.

Branchlets obtusely tetragonal, glabrate. Leaves (sometimes narrowly) obovate, up to 15 cm. long and 6.5 cm. wide, thin, glabrous above, sparsely appressed-hispid beneath, at apex acuminate, petiole indistinct and up to about 12 mm. long. Calyx about 1.3–1.5 cm. long; sepals thin, on dorsal surface (at least below middle) densely subappressed-hispid, now linear now widely oblong. Corolla ±2.2 cm. long; lobes narrowly lanceolate, very sharply apiculate, 10–12 mm. long.

Type specimen: Collected by *Francis R. Fosberg*, no. 10,369, leaves white beneath, flowers orange-yellow, calyx hirsute, bush 1 meter tall, in wet, boggy forest, alt. 1,235 meters, Puu Kaala, Waianae Mts., Waianaeuka, November 5, 1933 (Bish.).

Distribution: Known only from Mt. Kaala, in western Oahu.

Specimens examined: *Degener, Salucop, & Arlantico* 12,020, in rain-forest near summit, Kaala, May 1, 1938 (Deg.; Field; fruiting); *Francis R. Fosberg* 10,367*a*, bush 1.5 meters tall, leaves white beneath, in wet, boggy forest, alt. 1,225 meters, Puu Kaala, Waianaeuka, November 5, 1933 (Bish.; Field; sterile); *Fosberg* 10,369 (type, Bish.: cotype, Field; pistillate); *J. Arthur Harris* C242,120, shrub with yellow flowers, alt. 4,000 feet, summit of Puu Kaala, August 24, 1924 (Goth.; Minn.; subflowering).

The leaves of Fosberg's specimens are noticeably thin; they are also bluish-green, doubtless from the method of drying employed. *Harris* C242,120 has the leaves mostly narrow-obovate. It had been determined by Skottsberg as *Labordia Fagraeoidea* Gaud. (cf. Meddel. Göteborgs Bot. Trädgård 10: 154. 1936).

Labordia Fagraeoidea var. η **Saint-Johniana** Sherff, Amer. Journ. Bot. 25: 587. 1938.

Similar in habit to var. *waianaeana*. Inflorescence commonly 3–8-flowered, hispid, pedicels short. Sepals broadly ovate or rotund-cordate, at apex subobtuse or acute, on dorsal surface erectly appressed-hispid, commonly under 1 cm. long. Corolla about 1.5 cm. long; lobes yellow, reflexed, lanceolate or ovate, at apex sharp, more or less white-hispid within.

Type specimen: Collected by *Harold St. John*, no. 17,605, petals reflexed, yellow, shrub 5 meters tall, on wooded ridge, alt. 2,800 feet, Puu Kawiwi-Mt. Kaala ridge, Makaha-Waianaekai, Oahu, March 31, 1935 (Bish.).

Distribution: Waianae Range of western Oahu.

Specimens examined: *Francis R. Fosberg* 13,013, shrub 2 meters tall, flowers yellow, on moist, wooded ridge, alt. 800 meters, east ridge of Puu Kalena, Waianaeuka, March 22, 1936 (Bish.; Field; staminate); *Alfred Meebold* (*Otto Degener* distrib. no.) 10,239, alt. 4,000 feet, Waialua side of Puu Kaala, June 18, 1932 (Bish.; Deg.; subflowering); *St. John* 17,605 (type, Bish.: cotype, Field; staminate).

Labordia Fagraeoidea var. θ **longisepala** Sherff, Amer. Journ. Bot. 25: 587. 1938.

Branchlets slender, 1 or 2 terminal internodes moderately hispid. Leaves oblong-oblanceolate, at apex easily acuminate, cuneately narrowed below into a slender more or less setose, 5–11 mm. long petiole, glabrous above, sparsely appressed-hispid beneath, blade 5–8.5 cm. long and 1.5–3 cm. wide. Sepals lanceolate or widely

oblong, several-nerved, glabrate or irregularly and sparsely appressed-setose, 1.4–1.8 cm. long, equaling the corolla. Capsule unknown.

Type specimen: Collected by *Charles N. Forbes*, on Kaaawa Valley ridges, Oahu, May 30, 1909 (Bish.).

Distribution: Known only from type locality in northeasternmost Oahu.

Specimens examined: *Forbes*, Kaaawa Valley ridges, May 30, 1909 (type, Bish.; staminate).

A plant of peculiar aspect and deserving of more study. The type sheet bears three sprays, with a total of 4 inflorescences, these 1–3-flowered. The flowers are subsessile and subtended by apparently two distinct types of bractlets: one kind linear and about 3–4 mm. long, the other kind very delicately filiform and often 1–2 cm. long.

Labordia Fagraeoidea var. ι **septentrionalis** Sherff, Amer. Journ. Bot. 25: 588. 1938.

Leaves a little narrower and entirely or essentially glabrous beneath; sepals wider, ±1.5 cm. long. Corolla about 2.5 cm. tall, lobes lanceolate and sharply apiculate.

Type specimen: Collected (anonymously, but perhaps by *Joseph F. Rock*) on mountains of Punaluu, Oahu, August 18, 1908 (Bish.).

Distribution: Northern Oahu.

Specimens examined: *Anon.*, mountains of Punaluu, August 18, 1908 (type, Bish.; staminate); *Otto Degener* 10,247, in summit rain-forest, Pupukea-Kahuku region, April 1, 1929 (Deg.; Field; subflowering); *Otto Degener, R. Northwood, & J. Foster* 12,295, on shrubby, rain-swept summit, Anahulu Trail, Oahu, March 23, 1939 (Berl.; Deg.; Field; Par.); *Otto Degener & Kwan Park* 10,244, in rain-forest at summit, Pupukea-Kahuku region, March 27, 1933 (Deg.; Field; fruiting); *Degener, Park, Topping, & Bush* 10,236, shrub 4 feet tall, in rain-forest at summit, Pupukea-Kahuku, May 17, 1931 (Field; subflowering); *Francis R. Fosberg* 9,402, bush 1.5 meters tall, in wet forest, alt. 540 meters, Laie-Malaekahana Ridge, Koolau Mts., April 15, 1933 (Field; post-fruiting).

Labordia Fagraeoidea var. κ **Hillebrandii** var. nov.

Folia iis varietatis *septentrionalis* similia sed infra plus minusve adpresso-setosa. Inflorescentia saepius 5–15-flora. Sepala ovata vel ovato-oblonga vel oblongo-lanceolata, tergo nisi supra perspicue setulosa, 1–1.6 (–2.1) cm. longa. Capsula rostro ±2 mm. longo excepto 10–14 mm. alta.

Leaves similar to those of var. *septentrionalis* but more or less appressed-setose on lower surface. Inflorescence more often 5–15-flowered. Sepals ovate or ovate-oblong or oblong-lanceolate, dorsally very setulose at least below, 1–1.6 (–1.8) cm. long. Capsule 10–14 mm. tall exclusive of rostrum (this ±2 mm. long).

Type specimen: Collected by *William Hillebrand*, Hawaiian Islands (Kew).

Distribution: Oahu.

Specimens examined: *Otto Degener, E. Ordoñez, & J. Foster* 12,336, in rich, dense forest at summit, Puu Hapapa, Oahu, May 7, 1939 (Berl.; Deg.; Field); *Degener, Park, Bush, Potter, & Topping* 10,120 *pro parte*, a slender tree 12 feet tall, in forest, Anahulu Trail, Koolau Range, June 16, 1935 (Berl.; Deg.; Field; staminate; *cum L. molokaiana var. phyllocalyce commixt.*); *Hillebrand*, Hawaiian Isls. (type, Kew; subflowering and fruiting); *Hillebrand*, Kaala (Berl.; exactly matching type, of which it is undoubtedly a duplicate).

Appears to differ sharply from vars. *St. Johniana* and *waianaeana*, both likewise natives of northwestern Oahu, in its thicker, coriaceous leaves, these as firm as in the species proper.

Hillebrand (Fl. Haw. Isls. 290. 1888) specially noted the Kaala material (which he referred to *L. Fagraeoidea* proper) for its large outermost calyx-lobes (mostly ±2 cm. long and 8–13 mm. wide). He seems to have overlooked the possibility of teratology, but it is noteworthy that his two specimens at Berlin and one at Kew having hypertrophied sepals are sterile, while his other specimens (mounted on the same sheet in each case), with smaller sepals, have flowers or fruits. (Hillebrand, loc. cit., contrasted the Kaala material with that from Wailupe, which latter he likewise referred to *L. Fagraeoidea* proper. The Wailupe material is here referred, however, to var. *sessilis*, q.v.)

Labordia Fagraeoidea var. κ **Hillebrandii** f. 1. **subcalva** Degener & Sherff, f. nov.

A varietate ipsa calycis lobis dorsaliter glabris vel inferne tantum sparsim setulosis differt.

Differing from variety proper in having its sepals dorsally glabrous or only sparsely setulose below.

Type specimen: Collected by *Otto Degener, Emilio Ordoñez, & J. Foster*, no. 12,336*a*, in rich, dense forest at summit, Puu Hapapa, Waianae Range, Oahu, May 7, 1939 (Field).

Distribution: Known only from type locality in western Oahu.

Specimens examined: *Degener, Ordoñez, & Foster* 12,336*a* (type, Field: cotypes, Berl.; Deg.).

Labordia Fagraeoidea var. λ **simulans** Degener & Sherff, var. nov.

Ramuli subangulati, glabri. Petioli graciles usque ad 1.5 cm. longi; laminae elliptico-lanceolatae, apice attenuato-acuminatae, basi cuneatae, submembranaceae, infra glabrae vel sparsissime adpresso-setosae, usque ad 9 cm. longae et 3 cm. latae. Inflorescentia saepius 3- (interdum 1- vel 2-) flora, floribus iis *L. molokaianae* var. *phyllocalycis* similibus. Sepala plus minusve ovata, 5–9-nervata, dorso pallida et subsparse adpresso-hispida vel supra glabrata, circ. 1.2–1.4 cm. longa et 5–7.5 mm. lata, corollae tubum ±8 mm. longum superantia. Corollae lobi late lanceolati vel ovati, patentes reflexive. Capsula ignota.

Ultimate branchlets subangulate, glabrous. Petioles slender, up to 1.5 cm. long; blades elliptic-lanceolate, at apex attenuate-acuminate, at base cuneate, submembranaceous, beneath glabrous or very sparsely appressed-setose, up to 9 cm. long and 3 cm. wide. Inflorescence more often 3-flowered, the flowers similar to those of *L. molokaiana* var. *phyllocalyx*. Sepals more or less ovate, 5–9-nerved, dorsally pallid and subsparsely appressed-hispid or toward top glabrate, about 1.2–1.4 cm. long and 5–7.5 mm. wide, surpassing the corolla-tube. Corolla's lobes ovate or widely lanceolate, spreading or reflexed; tube ±8 mm. long.

Type specimen: Collected by *Otto Degener, Kwan Kee Park, D. LeRoy Topping, William Bush, & Colin Potter*, no. 10,284, a tree 12 feet tall, in forest, Waimano, Oahu, June 9, 1935 (Field).

Distribution: South-central to northwestern Oahu.

Specimens examined: *Degener, Ordoñez, & Foster* 12,356, in shrubby forest near top, southeast slope of Puu Hapapa, June 4, 1939 (Berl.; Deg.; Field; fruiting); *Degener, Park, Topping, Bush, & Potter* 10,284 (type, Field: cotypes, Berl.; Deg.; pistillate).

The slender leaf-petioles are more typical of *L. Fagraeoidea*, but the large sepals are suggestive of *L. molokaiana* var. *phyllocalyx*.

3. **Labordia pallida** H. Mann, Proc. Amer. Acad. 7: 196 (Enum. Haw. Pl. no. 384). 1867; Skottsberg, Meddel. Göteborgs Botan. Trädgård 10: 162, *fig. 20, i–m*. 1936.

Leaves glabrous, principal ones 2–3.5 cm. wide; capsule ±1.4 cm. long.....*L. pallida sensu stricto.*

Leaves appressed-hispidulous beneath, principal ones 5–6 cm. wide; capsule 1.6–2.3 cm. long.....var. *β hispidula.*

Glabrous, branchlets grayish and subterete to subtetragonal. Leaves mostly clustered toward tips of branchlets; petiole slender, 6–13 mm. long; blade oblong or narrowly obovate-oblong, membranaceous at least when dry, gradually or subabruptly narrowed toward base, at apex more acuminate than for *L. Fagraeoidea* proper, pale underneath, 6–11 cm. long and 2–3.5 cm. wide. Cyme sessile, 5–15-flowered; pedicels ±2 mm. long, slender, pubescent; bractlets linear, acute, pubescent, about 5 mm. long. Calyx more or less pubescent, 5–8 mm. long, deeply cleft into sharply lanceolate or linear-lanceolate lobes (these thin, 5–7- or rarely –9-nerved and having a broad, hyaline margin with densely ciliate edge). Corolla externally glabrate or puberulent, tube slightly pilose within and about 1 cm. long; lobes more or less spreading-hirsute within, 6–8 mm. long, about 1.5 mm. wide. Anthers oblong, only about 2.5 mm. long and 1 mm. thick, hardly mucronulate. Pistillode slenderly clavate, from apex gradually (not abruptly) narrowed downward, protruding about 5 mm. above calyx (as seen after removal or fall of corolla) and 0.3–0.5 mm. thick in thickest part. Capsules 2-valved.

Type specimen: Collected by *Horace Mann* and *William T. Brigham*, no. 611, Kealia, Kauai, 1864–1865 (herbarium not cited, but the Cornell University and Gray Herbarium specimens would probably have equal claim to ranking as the type).

Distribution: Kauai.

Specimens examined: *Charles N. Forbes* 689–*K*, Hii Mountains (Bish.; Mo.; fruiting); *Mann & Brigham* 611 (type collection, Bish.; Corn.; Field; Gray; Mo.; staminate); *Harold St. John & Francis R. Fosberg* 13,576, shrub 8 feet tall, leaves dark shiny green above, whitish beneath, in moist, mossy woods, alt. 1,800–2,000 feet, Wahiawa Valley, trail to Kahili Bog, Wahiawa, December 24, 1933 (Bish.; Field; sterile, but accompanied—in packet—with 4 capsules of a previous season, these 2-valved, about 1.7 cm. long, the exocarp mostly worn away).

The type specimens are staminate, whence it would appear that Mann's original description of the ovary ("ovario bi-triloculari") was obtained from inspection of the rudimentary ovary of a pistillode. The Forbes specimens from the Hii Mountains have leaves identical with those of the type collection, and the 1–3 capsules on short (3–6 mm.), stout, cernuous pedicels, 2-valved, ovoid or globose-ovoid, glabrate but of course wrinkled, 13–15 mm. long, the valves scarcely

carinate but minutely (±0.5 mm.) rostrate. The leaves of *L. pallida* appear, in herbarium specimens, thinner than those of *L. Fagraeoidea* proper and are more sharply acuminate at their apex. The narrowly clavate pistillodes are especially distinctive, the pistillodes in most other species of the genus being thickened-ovoid or -cylindric at top. Skottsberg (loc. cit.) studied this species, concluding that "to judge from the type collection, *L. pallida* has to be retained as a separate species." It is apparent from his description and figure, however, that the material examined by him had only younger pistillodes and hence failed to reveal fully one of its outstanding characters.

Labordia pallida var. *β* **hispidula** var. nov.

Folia majora, pauca (3) visa 14–16 cm. longa petiolo 1.5–2 cm. longo adjecto et 5–6 cm. lata, infra dense adpresso-hispidula. Sepala hispidula. Capsula glabrata, 1.6–2.3 cm. longa rostro minimo sub 0.4 mm. longo incluso.

Leaves larger, the few (3) seen measuring 14–16 cm. long including the petiole (this 1.5–2 cm. long) and 5–6 cm. wide. Sepals hispidulous. Capsule glabrate, 1.6–2.3 cm. long including the very small rostrum (this under 0.4 mm. long).

Type specimen: Collected by *Charles N. Forbes*, no. 256–*K*, Wahiawa Mountains, Kauai, August, 1909 (Mo.).

Distribution: Southern Kauai.

Specimens examined: *Forbes* (with *C. Dole*) 41–*K*, Waipau Valley and Ridge, July 15, 1909 (Berl.; Bish.; Field; Kew; Par.; fruiting); *Forbes* 256–*K* (type, Mo.: cotypes, Bish.; Field; Kew; fruiting).

4. **Labordia pedunculata** sp. nov.

Rami griseo-brunnei, teretes, glabri; ramulis subangulatis, glabris. Folia opposita, oblanceolata vel subrhomboideo-ovata vel oblongo-ovata, apice breviter acuminata, basi plus minusve sensim in petiolum forsan papillatum sed glabrum usque ad 1.5 cm. longum angustata; lamina coriacea, infra pallida, utrinque glabra, usque ad 12 cm. longa et 4.5 cm. lata, nervis principalibus lateralibus circ. 8–10 pro utroque latere; stipulis vix connatis, 2–4 mm. altis. Inflorescentia (floribus non visis) pedunculata pedunculo glabro demum 1.8–2.5 cm. longo 1.5–3 mm. crasso erecto recurvatove, 2- vel 3-pedicellata pedicellis tenuibus glabris 1.8–3 cm. longis moderate divergentibus mediane bracteolatis bracteola lineari subcapilliformive glabra ±3 mm. longa. Sepala 5, distincta, lanceolata, 5–7.5 mm. longa, non manifeste nervata. Capsula ovoidea, 2-valvata, glabra sed scrobi-

culata, ovario circ. 11–14 mm. longo et 1 cm. crasso, rostro tenui erecto vix 3 mm. longo; valvis ecarinatis.

Branches grayish-brown, terete, glabrous; branchlets subangulate, glabrous. Leaves oblanceolate or subrhomboid-ovate or oblong-ovate, at apex shortly acuminate, at base more or less gradually narrowed into a petiole, this perhaps papillate but glabrous and up to 1.5 cm. long; blade coriaceous, pallid underneath, glabrous on both surfaces, up to 12 cm. long and 4.5 cm. wide, about 8–10 principal lateral nerves on each side of midrib. Inflorescence (flowers not seen) pedunculate; peduncle glabrous, finally 1.8–2.5 cm. long and 1.5–3 mm. thick, erect or recurved, 2- or 3-pedicellate; pedicels slender, glabrous, 1.8–3 cm. long, moderately diverging, bracteolate at the middle with a linear or subcapilliform bracteole, this glabrous and ±3 mm. long. Sepals 5, distinct, lanceolate, 5–7.5 mm. long, not manifestly nerved. Capsule ovoid, 2-valved, glabrous but scrobiculate, its ovary about 11–14 mm. long and 1 cm. thick, its rostrum erect and barely 3 mm. long; valves ecarinate.

Type specimen: Collected by *Charles N. Forbes*, in Hawaiian Islands. The type label says, "E. Maui? 1920?" (Bish.).

Distribution: Not known for a certainty, except that the plant occurs somewhere in the Hawaiian Islands.

Specimens examined: *Forbes*, Hawaiian Isls. (type, Bish.).

A species with the foliar habit of *L. Fagraeoidea*, but differing from that species in its pedunculate inflorescence and 2-valved capsules, the valves of which are not carinate. Because of the uncertainty regarding the locality from which the type was obtained, it is much to be hoped that this species will before long be rediscovered and definite data as to its geographic occurrence be placed on record.

5. **Labordia pumila** (Hillebr.) Skottsb., Meddel. Göteborgs Botan. Trädgård 10: 160, *fig. 20, a–h.* 1936; *Labordia pallida* f. *alpina* Wawra, Flora 55: 516. 1872; *Labordia Fagraeoidea* var. *pumila* Hillebr. Fl. Haw. Isls. 290. 1888.

Dwarf, sparingly branched, glabrous shrub, ±3 dm. tall, with sharply or at times alately tetragonal branchlets. Leaves elliptic-obovate, basally cuneate and decurrent into a very short petiole, apically wide-rotundate and short-acuminate, very glabrous, softly coriaceous, when dry pale and glaucescent on lower surface (this beautifully and arcuately penninervate with much darker nerves), 4–10.5 cm. long and 2–4.5 cm. wide; stipules large, semicircular. Cymes up to 15-flowered, glabrous; capsuliferous pedicels at matu-

rity up to 15 mm. long, thickened, ligneous; bractlets filiform-linear to very narrowly linear-spatulate, 5–7 mm. long. Sepals oblong-linear to ovate-lanceolate, glabrous or obscurely pubescent, at apex more or less acute, 5–7-nerved, 8–11 mm. long and 2–3.5 mm.wide; corolla sparingly or moderately hirsute, 15–16 mm. long, its tube 9–10 mm. and narrow lobes 5–7 mm. long; sterile anthers sagittate, 1.8–2 mm. long; fertile anthers oblong, basally sagittate, 3.7–4 mm. long; pistillode glabrous, about 1.2 cm. long, its ovary cylindric-conic and 4–4.5 mm. long, its style filiform and about 4 mm. long, its 3 stigmata closely connate; pistil 8–10 mm. long; ovary cylindric-fusiform, 3-merous and 3-sulcate, about 7 mm. long and 3 mm. thick, glabrous or apically somewhat setose; style very short or lacking; stigmata 3, erect, 2.5–2.8 mm. long, externally covered with rather long and projecting papillae. Capsule ovoid-trigonous, shortly mucronate, glabrous, 12–13 mm. long and 6–8 mm. thick, the three valves obscurely carinate toward their apex.

Type specimen: Collected by *Heinrich Wawra*, no. 2,164 (alt. 5,080 feet, on the highest peak of Waialeale, Kauai, 1868–1871 (Mus. V.).[1]

Distribution: Northwestern Kauai.

Specimens examined: *Charles N. Forbes* 905–*K*, Alakai Swamp, July 3–August 18, 1917 (Bish.; subflowering); *Forbes* 938–*K*, Waimea Drainage Basin, same date (Bish.; fruiting); *Forbes* 1,153–*K*, Alakai Swamp, same date (Bish., 2 sheets; Field; fruiting); *Rev. J. M. Lydgate*, Kaholuamanu (Bish.; fruiting); *Joseph F. Rock*, Kauai, October, 1916 (Bish.; fruiting); *Rock* 4,874, without data (Bish.; staminate); *Rock* 5,813, summit of Waialeale, September 23, 1909 (Bish.; staminate); *Rock* 8,884, Waialeale, October 20, 1911 (Bish., 4 sheets of separate staminate and fruiting specimens; Gray, 1 sheet of pistillate and 1 sheet of separate staminate and fruiting material, the sheets studied by Skottsberg); *Carl Skottsberg* 964, Alakai Swamp, between Kokee and Kilohana, October 27, 1922 (Goth.; pistillate, both flowering and fruiting).

Hillebrand's herbarium (Berl.) contains no specimen representing *L. Fagraeoidea* var. *pumila* Hillebr. Indeed, Hillebrand's omission of his customary exclamation mark after the citation of locality shows that he himself had no private specimen at hand (cf. Hillebr.

[1] Skottsberg (loc. cit.) sets the sheet of staminate material of Rock 8,884 at Gray Herbarium as the staminate type and Skottsberg 964 (Goth.) as the pistillate type. His adoption of Hillebrand's varietal name *pumila*, however, compels us to accept as type the plant to which the name *pumila* directly leads, namely the type of *L. pallida* f. *alpina* Wawra, which was Wawra 2,164.

op. cit. XCI). His treatment is merely a translation from Wawra and the name *pumila* goes back directly to *L. pallida* f. *alpina* Wawra.

6. **Labordia Hedyosmifolia** Baill. Bull. Soc. Linn. Paris 1: 240. 1880; St. John, Occas. Paps. Bish. Mus. 12: no. 8: *pl. 2.* 1936; *Labordia Fagraeoidea sensu* A. Gray, Proc. Amer. Acad. 4: 323. 1860 (not Gaud.); *Labordia Grayana sensu* Skottsb. *pro parte,* Meddel. Göteborgs Bot. Trädgård 10: 158, *fig. 19, f–i.* 1936.

a. Blades of principal leaves elliptic-oblong, 2–4.5 cm. long and 1–1.5 cm. wide, plant of West Maui.....var. γ *Rockii.*

a. Blades of principal leaves various in shape but proportionately broader, normally larger; plants not confined to West Maui.

b. Capsules commonly 2-valved; plants of Hawaii.

c. Sepals dorsally hispid, mostly narrow-linear; capsules (including rostrum) ±1.8 cm. long; terminal internodes of branchlets hispid.....var. δ *robusta.*

c. Sepals more or less glabrate, broader.

d. Terminal internodes of branchlets hispid.
var. ζ *Skottsbergii.*

d. Terminal internodes of branchlets glabrous.

e. Leaves 5–9.5 cm. long and 2–3.5 cm. wide, definitely cuneate-obovate, the broad terminal portion subabruptly rounded to a short, narrow, subacute tip. var. ε *Grayana* (see also var. θ *magnifolia,* with leaves 9–13 cm. long and 3.5–5 cm. wide).

e. Leaves mostly otherwise.

f. Leaf blades 3–5.5 cm. long and 1.3–2 cm. wide; mature capsules barely 1.5 cm. tall including valvular rostra.
var. η *kilaueana.*

f. Leaf blades longer or wider or both; mature capsules about 1.8 cm. tall....*L. Hedyosmifolia sensu stricto.*

b. Capsules commonly 3-valved; plant native of Maui, northeastern Molokai, and Lanai.....var. β *centralis.*

b. Capsules 3-valved; plant native of Oahu.....var. ι *Hosakana.*

Small tree with stiff, angular branches, these glabrous or when young pubescent near tip. Stipules large, connected in a cup-shaped, shallowly or even very deeply emarginate ring, this dark except for a conspicuous, white-chartaceous, supernal border. Leaves commonly dark-brown when dry, greatly varying in shape, falsely suggesting three varieties; now narrowly elliptic-oblong or somewhat oblanceo-

late- or barely obovate-oblong (as in Remy 362, the type), now mostly obovate, now mostly oblong- or ovate-rotund; blade subacute or shortly acuminate at apex, widely or narrowly cuneate or even rounded at base, subcoriaceous, glabrous and inconspicuously veined above, glabrate or sparingly setose and conspicuously veined beneath (the lateral veins often beautifully arcuate, especially in ovate or subrotund leaves), mostly 5–11 cm. long and 2–5 cm. wide; petiole 4–12 mm. long. Cyme many- (6–15- or even to 22-) flowered, corymbiform or appearing umbellate-contracted, 3–7.5 cm. across, subsessile, branches divergent and often reflexed, the slender ultimate pedicels pubescent or (as in type) glabrous and 4–12 mm. long. Bractlets filiform, 6–12 mm. long. Calyx about 8.5–14 mm. long, cleft to base into 5 ovate to linear, glabrous or glabrate, mostly 3- or 5- or 7-nerved lobes. Corolla orange-colored, externally glabrate (unless above), internally white-pubescent, tube swollen, ±5 mm. thick and 10–13 mm. long, the commonly 6 lobes 6–9 mm. long. Pistillode ±12 mm. long; its ovary slender-conic, ±5 mm. long; style capillary but only about 1–3 mm. long; stigma delicately or stoutly cylindric or clavate, ±6 mm. long. Pistil ±12 mm. long; its ovary cylindric-fusiform, glabrous or at top hispid, ±5 mm. long; narrowed stylar portion ±1.5 mm. long; narrowly cylindric or obconic-cylindric stigma about 4 mm. long. Capsule conic-ovoid, ±1.8 cm. long (including inflexed valvular rostra), 2-valved, the valves moderately cristate-carinate near top.

Type specimen: Collected by *Jules Remy*, no. 362, on the Island of Hawaii, 1851–1855 (Par.).

Distribution: Hawaii, especially the northern half.

Specimens examined: *Miss L. M. Cranwell, Olof Selling, & Carl Skottsberg* 3,166*a*, in sphagnum bog, Kohala, above Waipio along ditch trail between ditch houses 1 and 2, September 8, 1938 (Goth.; "all flowers pistillate"); *iidem* 3,166*b*, same locality and date (Goth.; "all flowers bisexual except one staminate"); *Charles N. Forbes* 298–*H*, Kaalapuuwale, Kona, June 30, 1911 (Bish.; Field; Gray; subflowering); *Forbes* 509–*H*, Kohala Mts., Waimea, September, 1911 (Bish.; subflowering); *Forbes* 721–*H*, along trail to Wailuku River, eastern Hawaii, June 5, 1915 (Bish.; sterile); *Forbes* 723–*H*, in lava flow of 1855, Kilohana, June 6, 1915 (Bish.; subflowering); *Forbes* 726–*H*, eastern Hawaii, June 6, 1915 (Bish.; fruiting); *V. O. Fosberg* 54, bush 1.5–2 meters tall with yellow-orange flowers, in wet tree-fern forest, Hilo side of National Park, Kilauea, August 10, 1936 (Field; subflowering); *Rev. J. M. Lydgate*, Hilo (*ex herb. Hillebrandii*

in Berl.; subflowering); *Remy* 362 (type, Par.; two specimens on sheet, one flowering and staminate, one pistillate, with flowers and fruits); *Joseph F. Rock* 4,301, Alakahi Gorge, July 12, 1909 (Mus. V.; subflowering); *Rock* (similarly) 4,301, Alakahi-Kawainui Gorge, July 12, 1909 (Bish.; staminate); *Rock* 4,305, same locality and date (Bish., 2 sheets; staminate); *Rock* 8,316, alt. 4,200 feet, Alakahi Valley, Waimea, June, 1910 (Bish., 2 sheets; Gray; Mus. V.; variously staminate and pistillate); *Rock* 8,364, Honokane Nui Stream, Kohala, June, 1910 (Bish., 3 sheets; Gray; Mus. V.; variously staminate and pistillate); *Rock* 8,430, Awini, Kohala, same date (Bish., 4 sheets; Gray; Mus. V.; variously staminate and pistillate, flowering and fruiting); *Rock* 10,017, Hawaiian Isls. (Bish.; staminate); *Harold St. John & Edward Yataro Hosaka* 11,483 *A. H.*, shrub 15 feet tall, in rain-forest, alt. 4,800 feet, Puu Ahia, Kawaihae, Kohala Mts., January 2, 1932 (Berl.; Bish.; Del.; Field; Kew; Par.).

Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 157, *fig. 19, a–i.* 1936) presents, under *L. Grayana* Hillebr., an extended and critical study of this species, with an appended table (no. 3) of measurements of the floral parts on certain specimens examined. He segregates certain specimens from Maui and Lanai as var. *centralis* (vide infra) and states that the variety differs from the species proper "in the more pubescent leaves, and the almost glabrous, trimerous ovary." From the much larger assortment of specimens available for my study, it appears that the matter of leaf pubescence is unreliable. Some specimens from Hawaii have more pubescent leaves (as to lower surface) while various specimens from Maui have almost glabrous leaves. The dimerous ovary of the specimens from Hawaii seems, however, practically constant and has been relied upon by me as connoting the species proper. So far as I know, all material from Maui, Molokai, and Lanai has trimerous ovaries (hence capsules) and is to be referred to var. *centralis*.

Remy 362, the type, has one spray of staminate and one spray of pistillate material. The latter has both flowers and fruits. The former has several pistillodes and these have extremely delicate, clavate stigmas about 6 mm. long. In more recently collected specimens the pistillodes have stouter and more cylindric stigmas, exhibiting an approach to the stigmas of true pistils. Indeed, the stigmas as they protrude partly from the corolla-tube appear so much the same in staminate and pistillate flowers, that a further examination of the style and ovary, also the associated anthers (as to whether they are fertile or sterile) is necessary for positive identification.

Labordia Hedyosmifolia var. *β* **centralis** (Skottsb.) St. John, Occas. Paps. Bish. Mus. 12: no. 8: 7. 1936; *Labordia Grayana* var. *centralis* Skottsb., Meddel. Göteborgs Bot. Trädgård 10: 159, *fig. 19, k–r.* 1936.

Leaves often slightly more pubescent or setose beneath; capsule commonly trimerous (at times shorter and more globose).

Type specimen: Collected by *Carl Skottsberg*, no. 743, Puu Kukui, West Maui, October 9, 1922 (Goth.).

Distribution: Maui, Molokai, Lanai.

Specimens examined: *E. H. Bryan, Jr.*, 639, small tree, 3 meters tall, alt. 3,500 feet, in lower rain-forest, Haelaau, West Maui, December 20, 1928 (Field; fruiting); *Miss L. M. Cranwell* 3,403, near Pepeopae Bog, Molokai, September 21, 1938 (Goth.; staminate); *Cranwell* 3,503, Pelekunu, Molokai, June 24, 1938 (Goth.; subflowering); *Cranwell, O. Selling, & Carl Skottsberg* 2,671 *pro parte*, Puu Kukui, West Maui, July 26, 1938 (Goth.; subflowering); *iidem* 2,671*b*, on ridge above Haelaau, West Maui, August 1, 1938 (Goth.; fruiting) and 2671*c*, near Haelaau, July 28, 1938 (Goth.; pistillate); *Otto Degener* 10,258, in wind-swept rain-forest, near summit of Puu Kukui [Degener's label says "Mt. Eke"], West Maui, August 29, 1927 (Field; fruiting); *Degener* 10,259, same locality, August 30, 1927 (Berl.; Deg.; Field; pistillate); *Degener* 10,266, in rain-forest, Pipeline Trail, Olinda, East Maui, June 21, 1927 (Field; post-fruiting); *Degener* 10,274, in rain-forest along Papaala Pali, Molokai, June 6, 1928 (Berl.; Field; teratological, with many-flowered, compact inflorescence as in *L. Fagraeoidea* var. *sessilis*); *Degener* 10,301, summer, "either Molokai or Maui" (Field; subflowering); *G. R. Ewart* III, no. 97, in rain-forest, alt. 4,100 feet, Puu Kukui, West Maui, December 19, 1928 (Field; pistillate, post-flowering); *Ewart* no. 114, alt. 4,300 feet, in rain-forest, Haelaau-Puu Kukui Trail, West Maui, December 18, 1928 (Berl.; Bish.; Field; staminate); *Charles N. Forbes*, Nahiku, East Maui, July, 1910 (Bish.; Field; Mo.; fruiting); *Forbes*, with *Dr. C. Montague Cooke, Jr.*, no. 9–*M*, Maunahooma, Maui, May, 1910 (Bish.; Mo.; staminate); *Forbes* 42–*M*, Hanakaoo, West Maui, May, 1910 (Bish.; Brit.; Field; Par.; flowering and fruiting); *Forbes* 102–*M*, Iao Valley, West Maui, June, 1910 (Bish.; Brit.; Field; Mo.; fruiting); *Forbes* 204–*Mo*, mountains above Puu Kolekole, Molokai, June, 1912 (Berl.; Bish.; Field; Gray; Mo.; subflowering); *Forbes* 257–*M*, Nahiku, East Maui, July, 1910 (Berl.; Bish.; Field; Gray; Mo.; fruiting); *Forbes* 332–*Mo*, Wailau Trail, Molokai, August, 1912 (Field; staminate); *Forbes* 387–*M*,

Honokahau Drainage Basin, West Maui, September 25–October 17, 1917 (Bish.; pistillate); *Forbes* 1,688–*M*, right side of Kipahulu, East Maui, November 10, 1919 (Bish.; Field; staminate); *Forbes* 2,443–*M*, Wailuku Pali, West Maui, May 21, 1920 (Bish.; Field; staminate); *Forbes* 2,565–*M*, east bank of Honomanu Gulch, East Maui, June 21, 1920 (Berl.; Bish.; Field; fruiting; capsules subglobose, about 1 cm. tall exclusive of rostrum and about 1 cm. thick); *Forbes* 2,650–*M*, west side of Haipuaena Stream, East Maui, June 28–30, 1920 (Bish.; fruiting); *Forbes* 2,652–*M*, same locality and date (Bish.; subfruiting); *Forbes* 2,680–*M*, in swamp, alt. 2,000–3,000 feet, mountains above Hana, Paki, East Maui, July 5, 1920 (Bish.; Field; Kew; staminate and fruiting); *Francis R. Fosberg* 10,044, bush 0.5 meter tall, flowers orange-yellow, in moist forest, alt. 1,550 meters, Puu Kukui, between Haelaau and Nakalalua, West Maui, August 24, 1933 (Field); *William Hillebrand*, Hawaiian Isls. (Mus. V.; pistillate); *Hillebrand*, Haleakala, East Maui (Berl.; staminate); *Hillebrand*, Heights of Pelekunu, Molokai (Berl.; U. S.; staminate and pistillate); *Hillebrand*, West Maui, July, 1858 (Petrop.; subflowering); *Hillebrand*, West Maui, 1870 (Berl.; Gray; staminate); *Hillebrand*, Lanai, July, 1870 (Berl.); *Hillebrand*, "Eke Crater" (in reality Puu Kukui fide C. N. Forbes), West Maui, August, 1870 (Berl.; staminate); *Rev. J. M. Lydgate*, Hilo (*ex herb. Hillebrandii in* Berl.; pistillate); *Horace Mann & William T. Brigham* 434, mountain of West Maui (Bish.; Corn.; Gray; U. S.; pistillate; a form simulating type material of and, though less so, type plate of *L. Fagraeoidea* Gaud. and by Mann [Enum. Haw. Pl. no. 383. 1867] finally regarded as that species); *George C. Munro*, Puu Kukui, West Maui, September 25, 1916 (Bish.; small, fruiting branchlet, with small, narrowly ovate leaf-blades only 4–4.5 cm. long and about 2 cm. wide); *Munro* 610, forest bog, Puu Kukui, September 25, 1916 (Bish.); *Munro* 620, Puu Kukui, September 25, 1916 (Bish.; Field; staminate); *Joseph F. Rock*, Honomanu, East Maui, May, 1911 (Bish., 2 sheets; staminate); *Rock* 8,017, main ridge of Lanai, July 25, 1910 (Bish., pistillate); *Rock* 8,020, highest ridge of Lanai, Lanaihale, July 22, 1910 (Bish., 3 sheets; Field; Gray; Mus. V.; staminate and fruiting); *Rock* 8041, Lanaihale, July 25, 1910 (Bish.; Mus. V.; flowering and post-fruiting); *Rock* 8,153 *pro parte*, Honokawai, West Maui, August, 1910 (Bish.; pistillate); *Rock* 8,155, same locality and date (Bish.; staminate); *Rock* 8,185, Honokawai Gulch, West Maui, August, 1910 (Bish., 2 sheets; Mus. V.; flowering and fruiting); *Rock* 8,538, Honomanu, East Maui, September, 1910 (Bish.; Mus. V.; staminate); *Skottsberg*

743 (type, Goth.; staminate and pistillate); *Harold St. John* 10,228, wooded ridge, alt. 4,200 feet, above Honokowai, Haelaau, West Maui, February 6, 1930 (Bish.; N.Y.; flowering and fruiting; form with leaves pallid, only slightly hispid below, and approaching those of species proper; capsules 3-valved).

Labordia Hedyosmifolia var. γ **Rockii** Sherff, Amer. Journ. Bot. 25: 584. 1938.

Leaves smaller, shortly petiolate, the petiole more often 1–5 mm. long; blade elliptic-oblong, commonly 2–4.5 cm. long and 1–1.5 cm. wide, glabrous on both surfaces. Inflorescence about 3-flowered. Corolla ±1.5 cm. long, the calyx a half shorter.

Type specimen: Collected by *Rock* and *Hashimoto*, "Eke-Honokahau," West Maui, August, 1910 (Bish.).

Distribution: Known only from type locality in central-northern West Maui.

Specimens examined: *Rock & Hashimoto*, "Eke-Honokahau," West Maui, August, 1910 (type, Bish.; staminate).

A variety at once distinguished by its small, narrow, entirely glabrous leaves, as well as by its smaller flowers. A sheet of Mann and Brigham's specimens (no. 434 in Field Museum) of var. *centralis* has a flowering spray with small leaves only 2–3.5 cm. long and at first sight suggestive of this variety. Its leaves, however, are more oval and definitely somewhat hispid beneath as in the larger, more typical leaves of the second spray on the same sheet.

Labordia Hedyosmifolia var. δ **robusta** Sherff, Amer. Journ. Bot. 25: 584. 1938.

Terminal internodes hispid. Leaves conspicuously and narrowly cuneate-obovate, at apex subabruptly rounded and subacuminate, moderately appressed-hispid beneath, the blade commonly 4–7 cm. long and 1.5–3 cm. wide. Inflorescence ±15-flowered, in fruit 5–9 cm. wide, branchlets hispid. Sepals more often narrowly linear, 3–5-nerved, hispid at least on dorsal surface, at apex acute, 0.7–1.2 cm. long. Capsule about 1.8 cm. long (including valvular rostra; body proper about 1.4 cm. long), the two valves conspicuously cristate-carinate above middle, pedicel hispid and commonly 1.5–1.8 cm. long.

Type specimen: Collected by *Joseph F. Rock*, no. 10,015, Nalehu (Naalehu) forests, Hawaii, January, 1912 (Bish., 2 sheets).

Distribution: Known only from type locality in southern Hawaii.

Specimens examined: *Rock* 10,015 (type, Bish., 2 sheets: cotype, Gray; fruiting).

Labordia Hedyosmifolia var. ϵ **Grayana** (Hillebr.) Sherff, Amer. Journ. Bot. 25: 584. 1938; *Geniostoma Remyana* Baill. Bull. Soc. Linn. Paris 1: 240. 1880 (fide St. John, Occas. Paps. Bish. Mus. 12: no. 8: 7. 1936); *Labordia Grayana* Hillebr. Fl. Haw. Isls. 290. 1888 (*ex syn. Labordia Fagraeoidea sensu* A. Grayi); *sensu* Skottsb. *pro parte*, Meddel. Göteborgs Bot. Trädgård 10: 158, *fig. 19, d* and *e*. 1936; *Labordia Remyana* Baill. *ex* Skottsb., op. cit. 156.

Branchlets glabrous. Leaves essentially glabrous, shortly or moderately petiolate with petiole up to 1.5 cm. long; blade definitely cuneate-obovate, the broad terminal portion subabruptly rounded to a short, narrow, subacute tip, 4–8 cm. long and 2–3.5 cm. wide. Inflorescence 3–15-flowered, less than 5 cm. wide even at fruiting, glabrous. Sepals linear-oblong or oblong-ovate, glabrous, commonly 5-nerved, 7–15 mm. long. Capsule as in var. *robusta* but more slender and slightly shorter, its pedicel glabrous and 5–8 mm. long.

Type specimen: Collected by the *United States Exploring Expedition under Captain Wilkes*, Hawaii, 1840 (U.S).

Distribution: Island of Hawaii.

Specimens examined: *R. S. Bean* (*Otto Degener* distrib. no.) 10,877, Hawaii (Field); *Otto Degener* 10,245, in rain-forest, Napau Crater, December 5, 1929 (Deg.; Field; subflowering and post-fruiting); *Degener* 10,246, in shaded earthquake crack, near Sulphur Banks, Kilauea, October 21, 1929 (Deg.; Field; subflowering); *Degener & Y. Iwasaki* 10,242, in jungle, milepost, Glenwood, January 3, 1930 (Field; subflowering); *Degener, Iwasaki, Brumaghim, & Bartram* 10,243, in rain-forest, Napau Crater, January 25, 1930 (Berl.; Deg.; Field; pistillate); *Charles N. Forbes* 752–*H*, kipuka (i.e., an open, fertile place in forest) in 1855 lava flow, below Halealoha, June 7, 1915 (Bish.; Field, 2 sheets; Kew; Mo.; fruiting); *Harold St. John, Ross S. Bean, & Edward Y. Hosaka* 11,212, in wet ohia [i.e., *Eugenia malaccensis* L.] forest, alt. 2,700 feet, Napau Trail, Chain of Craters, Kilauea, December 20, 1931 (Bish.; Field; a form exactly matching cotype in N. Y.; staminate); *U. S. Explor. Exped.*, Hawaii, 1840 (type, U. S.: cotypes, Gray; N. Y.; staminate).

Asa Gray, working upon material collected on Hawaii by the United States Exploring Expedition, in 1840, doubtfully referred it (loc. cit.) to *Labordia Fagraeoidea* Gaud. Gray noted that his specimens possessed bivalvular capsules. Hillebrand (loc. cit.) excluded

Gray's cited plants from *L. Fagraeoidea* Gaud. and used them as a primary basis for his own *L. Grayana*. Hillebrand included also *Mann* and *Brigham* 434 (which had been referred by Horace Mann—Proc. Amer. Acad. 7: 196. 1867—to *Labordia Fagraeoidea* Gaud.), but that plant is varietally distinct (var. *centralis*). He included also material collected by Lydgate on Hawaii. Hillebrand's private herbarium (now in Berl.) contains a sheet of Lydgate's material from Hilo, Isl. of Hawaii, and this is clearly identical with the United States Exploring Expedition type and cotype specimens of *L. Grayana*.

Unknown to Hillebrand, however, Baillon (loc. cit.) had earlier described material (Remy 362) specifically (*but not varietally*) identical with the real type specimens of *L. Grayana* and had called it *Labordia Hedyosmifolia*. Skottsberg (Meddel. Göteborgs Bot. Trädgård 10: 156. 1936) cites five names proposed by Baillon and states: "Not one of these names is accompanied by a description. Some are vaguely characterized with a few words, but in no case sufficient for anybody who does not consult Remy's collection to know what Baillon understood by his species. His names are little more than nomina nuda." Skottsberg rejects Baillon's earlier *Labordia Hedyosmifolia* on principle, then, but does retain *L. Grayana* Hillebr. St. John (op. cit. 5) admits that one of Baillon's five species, namely *L. Echitis*, is a nomen nudum but adds: "The remaining four of Baillon's species. . . .have adequate descriptions, generally including habit, stipules, leaves, inflorescences, and flowers." St. John remarks that "Baillon's types are all collections by J. Remy from the Sandwich Islands. The specimens are adequate, all but one were labeled by Baillon, and all are available for study in the herbarium of the Museum Nationale d'Histoire Naturelle at Paris." St. John accepts *L. Hedyosmifolia* Baill. Nor do the International Rules permit any other course, for, after all, Baillon's description was a description, even if unorthodox in its presentation.[1]

Labordia Hedyosmifolia var. ζ **Skottsbergii** Sherff, Amer. Journ. Bot. 25: 584. 1938; *Labordia Grayana sensu* Skottsb. *pro parte*, Meddel. Göteborgs Bot. Trädgård 10: 158, *fig. 19, a–c*. 1936.

[1] As to Skottsberg's criticism regarding the necessity of consulting the Remy types for the comprehension of Baillon's specific concepts, we may lodge a like criticism against numerous authors, particularly the pioneers (who wrote when "species" were few and hence seemed sufficiently well described with a few words or lines) and some of the modern writers working in large genera. Fortunately, we have for the present numerous types on which to rely. With the lapse of time, however, and the destruction of many of these types by use, insects, fires, floods, etc., the need for full and carefully drawn descriptions will become ever more urgent.

Terminal internodes hispid. Leaves petiolate, petiole 1–2 cm. long; blade obovate or cuneate-obovate, subabruptly rounded and almost sub-acuminate at apex, along veins beneath moderately elsewhere sparsely appressed-hispid, 6–11 cm. long and 3.5–5.2 cm. wide. Inflorescence open, hispid, ±5-flowered. Calyx 1.2–1.5 cm. tall; sepals oblong-lanceolate, 3–7-nerved, glabrous or glabrate. Corolla scarcely 2 cm. tall.

Type specimen: Collected by *Carl Skottsberg*, no. 590, in forest above Pahala, south slope of Mauna Loa, Hawaii, September 19, 1922 (Bish.).

Distribution: Known only from type locality in southern Hawaii.

Specimens examined: *Skottsberg* 590 (type, Bish.: cotype, Goth.; staminate and fruiting).

The type had been determined by Skottsberg as *Labordia Grayana* Hillebr. (cf. Meddel. Göteborgs Bot. Trädgård 10: 157. 1936). It differs at once, however, in having leaf blades hispid (not glabrous) below, and much larger (6–11 cm. long and 3.5–5.2 cm. wide, not 4–8 cm. long and 2–3.5 cm. wide), also branches of inflorescence and terminal internodes of branchlets hispid (not glabrous).

Labordia Hedyosmifolia var. η **kilaueana** Sherff, Amer. Journ. Bot. 25: 585. 1938.

Similar to var. *Rockii*. Terminal internodes of branchlets glabrous. Leaves elliptic-oblong or more rarely oblong-oblanceolate, at apex subacute, on both surfaces glabrous, blade 3–5.5 cm. long and 1.3–2 cm. wide, petiole 2–6 mm. long. Inflorescence (flowers unknown) finally glabrous, contracted, in fruit less than 4 cm. across. Sepals linear-lanceolate, 3–7-nerved, at apex acute, dorsally glabrous, finally 7–13 mm. long. Capsular valves scarcely 1.5 cm. long including crests.

Type specimen: Collected by *Francis Raymond Fosberg*, no. 10,102, shrub 1 meter tall, in wet forest, alt. 810 meters, between Makaopuhi and Napau Craters, Chain of Craters, Kilauea, Hawaii, August 29, 1933 (Bish.).

Distribution: Known only from type locality in southeastern Hawaii.

Specimens examined: *Fosberg* 10,102 (type, Bish.: cotype, Field; fruiting).

Labordia Hedyosmifolia var. θ **magnifolia** Degener & Sherff, var. nov.

Ramuli glabri. Folia ut in var. *Grayana* sed majora et magis membranacea, petiolo usque ad 2 cm. longo, lamina 8–11 cm. longa et 3.5–5 cm. lata. Sepala paulum angustiora et longiora quam pro var. *Grayana*.

Branchlets glabrous. Leaves as in var. *Grayana* but larger and more membranaceous, the petiole up to 2 cm. long, the blade 8–11 cm. long and 3.5–5 cm. wide. Sepals slightly narrower and longer than in var. *Grayana*.

Type specimen: Collected by *Otto Degener*, no. 1,599, perhaps at Kilauea, Hawaii, in 1922 or 1923 (Field).

Distribution: Eastern Hawaii. The type label had been lost but the collector wrote on sheet, "either from Kilauea, or possibly from Pauoa Flats, Oahu." In view of the recent rediscovery of this variety on Hawaii, it seems probable that the type came from Kilauea.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 3,256, in fern forest, "23 miles," along road, Hilo-Kilauea, September 13, 1938 (Goth.; pistillate); *Degener* 1,599 (type, Field; post-flowering).

The type has a loose, glabrate inflorescence about 5 cm. across. The slender sepals are mostly 1.5–1.7 cm. long and apically acute. The leaves are notably thin and pallid. They suggest those of var. ζ *Skottsbergii*, a variety differing at once in the hispid terminal internodes of its branchlets.

Labordia Hedyosmifolia var. ι **Hosakana** Sherff, Amer. Journ. Bot. 25: 584. 1938.

Branches numerously nodose, branchlets angulate and densely tomentose-hispid; stipules ±4 mm. tall, externally hispid and herbaceous below but glabrate and hyaline above. Petioles densely hispid and 3–10 mm. long; blades now short-ovate now obovate, on upper surface glabrous and impressedly nerved, on lower surface salient-nerved and more or less hispid along the nerves, at apex submucronate or acute or even rotund, at base rotund or more or less cuneate, at margins often irregularly revolute, commonly 1.5–6 cm. long and 1–3.4 cm. wide. Inflorescence sessile, umbellate-contracted, included by the leaves, 7–20-flowered. Sepals distinct, linear-oblong or linear-subulate, externally glabrate or sparsely white-setose, marginally subdiaphanous and often conspicuously ciliate, lengthwise 3–7-nerved, 7–14 mm. long. Corolla slender or slightly ventricose below, outwardly glabrous or sparsely setose, about 1.5–2.5 cm.

long, tube about 0.8–1.5 cm. long, lobes lanceolate and internally white-setose. Pedicel sparsely setose, ±6 mm. long, its bractlet very slenderly elongate-linear and 7–10 mm. long. Capsule globose-ovoid, 3-valved, the mature ovary glabrous and about 1 cm. long, style (rostrum) glabrous or sparsely setulose and about 3–4 mm. long; valves sharply carinate above. Staminate flowers not examined.

Type specimen: Collected by *Edward Yataro Hosaka*, no. 679, shrub 4 feet tall, on denuded ridge, alt. 2,500 feet, Kipapa Gulch, south ridge, Waipio, Koolau Range, Oahu, July 4, 1932 (Bish.).

Distribution: Kipapa Gulch to Aiea, Koolau Range, Oahu.

Specimens examined: *Degener, Park, Potter, & Bush* 10,152*a*, on wind-swept summit, Kipapa Trail, Koolau Range, June 2, 1935 (Berl.; Deg.; Field; Gray; Kew; pistillate, flowering and fruiting); *Degener, Salucop, & Arlantico* 11,553, on wind- and rain-swept summit, C. C. C. Trail, Aiea, December 6, 1937 (Deg.; Field; sterile); *Degener, Takamoto, & Martinez* 10,542, shrub 2 feet tall, at wind-swept summit, C. C. C. Trail, Aiea, March 15, 1936 (Deg.; Field, 2 sheets; subflowering); *Francis R. Fosberg* 9,729, on exposed ridge, alt. 860 meters, Kipapa Gulch, Waipio, August 6, 1933 (Field; flowering and fruiting); *Hosaka* 679 (type, Bish.: cotype, Field; flowering and fruiting).

This variety was named for Mr. Hosaka, who collected not only the type but also numerous other specimens of *Labordia*, all of which he very generously placed at my disposal. Some of the stems examined are closely invested with fine moss, and the whole habit is that of a very scraggly, dwarfed, much branched shrub. The umbellate-contracted, numerously flowered inflorescence and tomentose-hispid branchlets give an appearance suggestive of *Labordia Fagraeoidea* var. *sessilis*. The more often ovate and usually shorter, irregularly revolute leaves of var. *Hosakana*, however, also their more conspicuous venation and the elongate, narrow, frequently ciliate, acute sepals separate it satisfactorily from that variety. By some botanists, the Hosaka type might be taken to represent a new species (and by myself it was indeed so considered originally). With *L. Hedyosmifolia*, however, it is joined most conclusively through *L. Hedyosmifolia* var. *centralis*, a variety present on Maui, Molokai, and Lanai, but absent on Oahu, and offering within its range of variations many close counterparts to the several *facies* observable in var. *Hosakana*.

7. **Labordia venosa** Sherff, Amer. Journ. Bot. 25: 579. 1938.

Shrubby or perhaps becoming a tree; branchlets subterete, brownish-gray, toward their tip (for 1–4 internodes) antrorsely and arcuately appressed-setulose, elsewhere glabrous. Leaves delicately petiolate; petiole submarginate, hispidulous, 0.8–1.5 cm. long; blade obovate or obovate-oblong, at margins subrepand-entire, at base gradually at apex more or less abruptly narrowed, 6–10 cm. long and 2–4.5 cm. wide, numerously and conspicuously veined, coriaceous and subglabrous above, on lower surface conspicuously hispidulous along both large and small veins but elsewhere glabrous. Stipules auriculoid, intrapetiolar, conspicuous, 2–4 mm. tall. Inflorescence terminal, sessile, compact, 3–4 cm. in diameter at flowering, in fruit 4–6 cm. in diameter, 10–30-flowered; ultimate pedicels noticeably hispid, at flowering ±2 mm. but in fruit up to 1 (rarely 1.5) cm. long. Calyx pubescent below, glabrous above, 4–6 cm. long, deeply (almost to the base) 5-lobed; lobes linear-lanceolate or linear-oblong, 1–2 mm. wide, at apex obtuse or subacute. Corolla about 1 cm. long, very sparsely pubescent outside, 5-lobed, the linear lobes acute and 4–5 mm. long, tube up to 3.5 mm. thick. Capsule black, 2-merous, (1–) 1.2–1.6 (rarely–1.8) cm. long; valves outwardly more or less puberulous, toward apex conspicuously carinate.

Type specimen: Collected by *Joseph F. Rock*, no. 8,627, Ukulele–Waikamoi, East Maui, October, 1910 (1st type sheet, Bish.; flowering material) and by *Charles Noyes Forbes*, no. 762–*M*, Ukulele, East Maui, July, 1919 (2nd type sheet, Bish.; fruiting material).

Distribution: Northeastern East Maui.

Specimens examined: *Otto Degener* 10,267, in rain-forest, Pipe-line Trail, Olinda, June 26, 1927 (Field; fruiting); *Degener* 10,268, same locality, June 20, 1927 (Deg.; Field; fruiting); *Degener* 10,270, same locality June 27, 1927 (Berl.; Deg.; Field; fruiting); *Degener & D. LeRoy Topping* 10,263, same locality, July 30, 1927 (Deg.; Field; subflowering); *Charles N. Forbes*, Keanae Gap, Haleakala Crater, August 7, 1919 (Bish.); *Forbes* 152–*M*, woods near Ukulele, above Olinda, July, 1910 (Bish.; fruiting); *Forbes* 637–*M*, Keanae Pali, east of Ukulele, July 17, 1919 (Bish.; sterile); *Forbes* 760–*M*, Ukulele, July, 1919 (Bish.; subflowering and post-fruiting); *Forbes* 762–*M* (Bish., 2nd type sheet; fruiting); *Forbes* 882–*M*, east of Ukulele, July 20, 1919 (Bish.; sterile); *Forbes* 888–*M*, same locality, July 21–23, 1919 (Bish.; fruiting); *Forbes* 963–*M*, Ukulele, July 27, 1919 (Bish.; Field; fruiting); *Forbes* 1,080–*M*, Keanae Gap, Haleakala, August 7, 1919 (Bish.; subflowering); *Forbes* 1,237–*M*, north slope of Haleakala,

August 23, 1919 (Bish.; Field; fruiting); *Forbes* 1,253–*M*, Ukulele, August 4, 1919 (Berl.; Bish.; Field; Gray; variously staminate and pistillate); *Joseph F. Rock* 8,538, Honomanu, September, 1910 (Bish.; pistillate); *Rock* 8,627 (Bish., 1st type sheet; Mus. V.; staminate).

The specimens studied had been determined as *L. Grayana* Hillebr., which reduces to *L. Hedyosmifolia* var. *Grayana*. From *L. Hedyosmifolia* and its varieties, especially the sometimes simulating var. *centralis*, it differs in numerous characters of foliage, flowers, and fruits, but can be distinguished perhaps most easily by its lower leaf surfaces. These have a conspicuously reticulate venation, often with 15–25 principal veins on each side of the midvein. While the areolae of lower leaf-surface enclosed within the reticulations are glabrate, the lower surfaces of the veins themselves are densely hispid with short, curved, sharp, closely investing setae.

Forbes 152–*M*, from woods near the type locality, differs from the other fruiting specimens cited in having capsules barely 1 cm. long and pedicels mostly about 1.5 cm. long. Enough evidence to warrant varietal segregation, however, seems lacking.

8. **Labordia Wawrana** Sherff, Amer. Journ. Bot. 25: 579. 1938.

Branches brownish-gray, subterete, nodes often numerous, stipules distinct; terminal internodes densely hispidulous, drying subangular and reddish-black. Leaves disposed at and near ends of branchlets, oblong-oblanceolate, at apex subabruptly acuminate, membranaceous, glabrous above, hispidulous beneath, 1–2 dm. long and 3–6 cm. wide, with ±20 principal lateral veins to each side, more often gradually narrowed into a margined petiole, this hispidulous and commonly less than 1 cm. long. Inflorescence cymose, 15–30-flowered, conspicuously hispid, cernuous. Flowers (only the staminate known) slender. Calyx hispid, deeply cut often to the very base, 10–12 mm. long, lobes linear-subulate. Corolla white-hispid with short hairs outside and long ones inside; tube 11–16 mm. long and commonly 2–3.5 mm. thick; lobes linear-subulate, 8–9.5 mm. long. Anthers oblong-linear, about 2.5–2.7 mm. long. Pistillode about 13–14 mm. long; its style slender, densely (unless at top) spreading-setose, produced above the sepals into a very narrowly obconic stigma about 4.5 mm. long.

Type specimen: Collected by *Heinrich Wawra*, no. 2,200*b*, Waialeale, Kauai, between end of December, 1869, and May 1, 1870 (Mus. V., 2 sheets).

Distribution: Known only from type locality in central Kauai.

Specimens examined: *Wawra* 2,200*b* (2 type sheets, Mus. V.; staminate).

9. **Labordia mauiensis** Sherff, Amer. Journ. Bot. 25: 580. 1938.

Dwarf shrub ±3 dm. tall; branches sometimes prostrate and rooting, otherwise suberect; branchlets angulate and glabrous; stipules less than 2 mm. tall, often imperfectly connate. Leaves glabrous, gradually narrowed below to a petiolate base; petiole marginate, 3–10 mm. long; blade elliptic-oblanceolate, pallid, at apex subobtuse or subacute or rarely subacuminate, submembranaceous, when dry commonly revolute, 3–6.5 cm. long and 8–15 mm. wide; principal lateral nerves 4–6 to each side, subobscure above but moderately plain beneath. Inflorescence cymose-corymboid, not exserted, commonly 5–15-flowered, more often 2–3.5 cm. long and 3–4 cm. wide, glabrous (or sometimes loosely setulose upon the branchlets), bractlets linear and about 4 mm. long. Calyx deeply (almost or entirely to the base) cut, now glabrous now hispidulous; lobes oblong-linear or lanceolate, at apex obtuse or acute, 3–5-nerved, narrowly hyaline-margined, now (as on type) 4–6 now even 5–10 mm. long. Corolla outwardly glabrate or pubescent, inwardly white-hispid, tube 1–1.5 cm. long and 1–4 or even up to 6 mm. thick, lobes narrowly or widely lanceolate and 4–6.5 mm. long. Anthers linear, sterile about 2 mm. fertile about 2.2 mm. long. Pistillode about 13 mm. long; its ovary black when dry, conic, very sparsely setulose, about 5 mm. long; style filiform, hispid below, about 4–5 mm. long; stigmas narrowly obconic, papillate-pubescent, 3–4 mm. long. Pistil (immature) about 8 mm. long, ovoid-conic, toward base subglabrate, elsewhere conspicuously and densely erect-hispid, style not distinct.

Type specimen: Collected by *Joseph F. Rock*, Nahiku Stream, East Maui, May, 1911 (Bish.).

Distribution: Northeastern East Maui.

Specimens examined: *Otto Degener* 10,264, in dense, dark rainforest, Pipe-line Trail, Olinda, June 21, 1927 (Berl.; Deg.; Del.; Field; Gray; Kew; Mo.; Mun.; Mus. V.; Par.; U.S.; pistillate); *Rock*, Nahiku Stream, May, 1911 (type, Bish.: cotypes, Gray; Mus. V.; staminate).

Rock had regarded this as a new species but did not describe it.

10. **Labordia glabra** Hillebr. Fl. Haw. Isls. 291. 1888.

a. Corolla externally glabrous or glabrate; sepals linear to ovate-lanceolate; plants native of Maui.

b. Capsule short-globose, about 1.2 cm. tall; plant of West Maui. *L. glabra sensu stricto.*

b. Capsule more elongate, ovoid, 17–19 mm. tall; plant of East Maui.....var. β *orientalis.*

a. Corolla externally hispid; sepals broadly ovate; plant native of Oahu.....var. γ *latisepala.*

Mostly glabrous; branchlets angulate, terminal 1 or 2 internodes at times sparsely setulose, stipules connected in an entire or emarginate ring. Leaves oblanceolate or even narrowly obovate, at times sparsely appressed-hispid underneath especially near veins, cuneately narrowed from middle into a slender sparsely hispidulous petiole 7–15 mm. long, at apex suddenly and distinctly acuminate, membranous, not pallid when dry, blade 7–14 cm. long and 2–4 cm. wide. Flowers solitary or perhaps at times 2 or 3; peduncle glabrous, 4–8 mm. long, beset above its base with 2 bractlets, these linear-lanceolate and about 6 mm. long. Calyx lobes subequal, linear-lanceolate or at fruiting ovate-lanceolate, glabrous, equaling corolla-tube in length. Corolla glabrous outside, puberulous inside; tube 7–10 mm. long and 4–5 mm. thick; lobes spreading-reflexed, 7–10 mm. long. Capsule short-globose, about 1.2 cm. tall, 3-valved, valves more or less incurved-rostrate at apex but not definitely carinate.

Type specimen: Hillebrand cited first Waihee and next Wailuku as the localities for this species. The Waihee sheet has two remaining sprays of flowering material, collected by Rev. J. M. Lydgate, Valley of Waihee, West Maui, August, 1870. The Wailuku sheet carries a collection number 139, doubtless of Hillebrand's own collecting, and bears three sprays of fruiting material. Hillebrand's description of the flowers clearly was based on the Waihee and, of the fruits, on the Wailuku specimens (Berl.).

Distribution: Northeasternmost part of West Maui.

Specimens examined: *Hillebrand,* Wailuku (2nd type sheet, Berl.; fruiting); *Lydgate,* Valley of Waihee, August, 1870 (1st type sheet, Berl.; flowering).

Labordia glabra var. β **orientalis** Sherff, Amer. Journ. Bot. 25: 588. 1938.

Capsule more elongate, ovoid, 17–19 mm. tall (including the 2–3.5 mm. long rostrum), valves now 3 now only 2; sepals mostly linear.

Type specimen: Collected by *Joseph F. Rock,* no. 10,344, Honomanu, northeastern East Maui, May, 1911 (Bish., 2 sheets).

Distribution: Eastern part of East Maui.

Specimens examined: *Charles N. Forbes* 1,644–*M*, ridge, left side of Kipahulu Valley, southeastern East Maui, November 15, 1919 (Bish.; post-fruiting); Rock 10,344 (2 type sheets, Bish.: cotype, Mus. V.; fruiting).

The Forbes material had been determined at Bishop Museum, apparently by Forbes himself, as a variety of *L. glabra* Hillebr., and the 2-valved capsule had been noted on the sheet ("capsule not 3-valved"). Rock had made a special study of his own no. 10,344 and determined it, under date of April 6, 1914, as *L. glabra* Hillebr. The elongate fruits are quite distinct, however, from the short, globose ones of the species proper (both type sheets of which are now before me). It is evident that the Rock and the Forbes specimens represent a geographic variety native to East Maui and easily recognized, at least when fruits are present, from the species proper of West Maui.

Labordia glabra var. γ **latisepala** var. nov.

Foliorum petioli glabri. Florae 2 vel 3; sepalis moderate lateve ovatis, margine diaphano ciliatoque latioribus, quam corollae extus albo-hispidae tubo plerumque brevioribus.

Leaf-petioles glabrous. Flowers 2 or 3; sepals moderately or broadly ovate, with the diaphanous and ciliate margin wider, commonly shorter than the outwardly white-hispid corolla-tube.

Type specimen: Collected by *Edwin H. Bryan, Jr.*, no. 837, a small tree 5–6 meters tall, flowers orange-yellow, in moist rainforest, alt. 2,300 feet, Kaluanui, Oahu, October 14, 1934 (Bish.).

Distribution: Known only from type locality in northeasternmost Oahu.

Specimens examined: *Bryan* 837 (type, Bish.: cotype, Field; pistillate).

11. **Labordia Cyrtandrae** Baill. *ex* Skottsb. Meddel. Göteborgs Bot. Trädgård 10: 156. 1936; cf. St. John, Occas. Paps. Bish. Mus. 12: no. 8: 5, and *pl. 1*. 1936; *Geniostoma Cyrtandrae* Baill., Bull. Soc. Linn. Paris 1: 239. 1880; *Labordia hypoleuca* Deg. Fl. Haw. fam. 302, Aug. 10, 1932; cf. St. John, op. cit. 10: no. 4: 4. 1933.

Leaves densely appressed-pilosulous beneath; sepals lanceolate, acuminate.....*L. Cyrtandrae sensu stricto.*

Leaves sparsely or on veins moderately to densely appressed-setulose beneath; sepals narrower, often almost filiformly narrowed from near base.....var. β *nahikuana.*

Shrub 2–3 meters tall; young branches green, fleshy, terete, granular-puberulent or appressed-pilosulous; youngest nodes gelatinous; branches stout, the bark becoming smooth and brown; innovations from the uppermost axils below the inflorescence; stipules united into a sheath, 3–6 mm. tall, remotely ciliate, membranous, pointed or emarginate midway between the petioles; leaf-axils with many subulate glands, these 0.6–0.8 mm. long and white but blackening on drying. Leaf-petioles green, appressed-pilosulous, 1–5 cm. long and 3–8 mm. in diameter; blades broadly and at times somewhat obovately elliptic to ovate-elliptic, moderately or broadly cuneate at base, short-acuminate at tip, nearly glabrous and dark glossy-green above, below whitish and appressed-pilosulous, 7–26 cm. long and 2–14.5 cm. wide, the principal lateral veins 7–13 on each side and curved towards apex. Inflorescence a terminal, 2-forked, 8–82-flowered cyme, the recurved branches 1–4 cm. long and, like the pedicels, appressedly and antrorsely pilosulous with whitish hairs; bractlets 3–6 mm. long, linear, white-pilosulous; flowers sessile or on pedicels, these thickened towards the tip and 1–17 mm. long. Sepals 5–6, pale green, lanceolate, acuminate, unequal, pilosulous, 6–11 mm. long, the tips somewhat convolute. Corolla in bud convolute (the lobes closed to the apex), pale greenish-yellow, shading to whitish at base, glabrous or slightly pilosulous without, sparsely pilosulous within the tube and the base of the lobes, 2.6–3.7 cm. long; tube cylindric, 1.5–2.3 cm. long and 3–5 mm. in diameter; the five lobes reflexed, subulately linear-lanceolate, 8–13 mm. long; anthers lanceolate, pale yellow, attached from their median points to the base of the sinuses of the corolla lobes, 3–4 mm. long, their tip with a stout ovate apiculation, the base cleft one-fourth of the length. Pistillode about 2 cm. long; its ovary subulate, gradually tapering above, with a hispid band just above the middle; style glabrous, about 4 mm. long; stigma 7 mm. long, clavate, 2 mm. thick, green, white-hispidulous especially towards tip, often also with a faint crease towards tip. Capsule fusiform, terete or nearly so, bivalved, 1.8–5 cm. long and 8–12 mm. thick, valves carinate near apex, the acute rostrum flattened perpendicular to the septum (and appearing as an extension of the valvular keels) and extending 5 mm. or more beyond the tip of the locules, the dehiscence loculicidal from the tip or from both the tip and the base; seeds imbedded in a yellowish pulp, asymmetrically ovoid, white or pale brown, 2.5–3.5 mm. long, their testa with a conspicuous light cellular network, the hilum linear and nearly as long as the flattened side of the seed.

Type specimen: Collected by *Jules Remy*, no. 358*bis*, on mountains, Oahu, April, 1855 (Par., 2 sheets).

Distribution: Northeastern Oahu, in the Koolau Mountains.

Specimens examined: *Otto Degener, K. Park, & Y. Nitta* 4,174, in wet forest, at summit of Pig-God Trail, Punaluu, June, 1932 (Deg., 4 sheets; Field, 2 sheets; type and cotypes of *L. hypoleuca* Deg.; staminate and subfruiting); *Degener, Park, Colin Potter, William Bush, & D. LeRoy Topping* 10,000, in wet, forested gully, Kipapa Trail to Koolau summit, June 2, 1935 (Deg., 2 sheets; Field; staminate); *iidem* 10,001, on rich, wet slope in rain-forest, west of Poamoho Trail, Laie, August 25, 1935 (Deg.; Field; sterile); *Degener, K. Park, & Gordon Shigeura* 10,017, in wet, shady glen, Waimano Trail near summit, Koolau Range, October 6, 1935 (Deg.; Field; sterile); *Degener, Park, Bush, Potter, & Topping* 10,021, in woods near summit, Anahulu Trail, Koolau Range, June 16, 1935 (Deg.; staminate); *Charles N. Forbes*, Koolauloa Mts., between Punaluu and Kaipapau, November 14–21, 1908 (Bish.; staminate); *Forbes*, Makaha Valley, February 12–19, 1909 (Field; subflowering); *Forbes & C. L. Thompson*, same locality, May 3–8, 1909 (Berl.; Field; Gray; Kew; Mo.; Par.; staminate); *Francis R. Fosberg* 9,551, bush 1.5 meters tall, alt. 450 meters, in wet forest, Kipapa Gulch, Waipio, June 12, 1933 (Bish.; Field; staminate); *Fosberg* 10,345, bush 1 meter tall, alt. 430 meters, in wet forest at bottom of gulch, ridge southeast of Maakua Gulch, Koolau Mts., Hauula, October 15, 1933 (Bish.; Field; fruiting); *Fosberg* 14,234, shrub 4 dm. [sic!], leaves pallid beneath, flowers pale yellow, in dense shade, wet forest, alt. 450 meters, Laie Trail, Kahawainui Ihiihi, Laie, Koolau Mts., July 24, 1937 (Field; staminate); *William Hillebrand*, Wahiawa, April (Berl., *sub nom. L. membranacea* Mann.; subflowering); *E. Y. Hosaka*, shrub 5 feet tall, in moist gully, alt. 1,500 feet, Waikakalaua Gulch, Koolau Mts., April 6, 1930 (Bish.; Field; subflowering); *Hosaka* 602, in moist gully, alt. 1,500 feet, Kipapa Gulch, south ridge, Koolau Mts., July 4, 1932 (Berl.; Bish.; Field; Kew; staminate and subfruiting); *Hosaka* 1,002, shrub 4 feet tall, in wet gully, alt. 1,700 feet, Kipapa Gulch, Koolau Mts., May 6, 1933 (Berl.; Bish.; Field; Gray; subflowering and post-fruiting); *Hosaka* 1,062, shrub 5 feet tall, alt. 1,500 feet, Kipapa Gulch, 2nd north fork, Koolau Mts., June 11, 1933 (Bish.; Field); *Hosaka* 1,063, shrub 4 feet tall, in wet gully, alt. 1,500 feet, south ridge, Kipapa Gulch, Waipio, Koolau Mts., July 4, 1932 (Bish.); *Remy* 358*bis* (Par., one of two type sheets; subflowering; the other type sheet known to me only through St. John's plate

made from it); *Harold St. John* 10,464, shrub 8 feet tall, on wet, wooded slope, alt. 1,600 feet, Waikakalaua Gulch, Koolau Mts., April 6, 1930 (Berl.; Bish.; Del.; Field; Par.; pistillate); *Harold St. John & Edward Yataro Hosaka* 10,567, same place, September 14, 1930 (Berl.; Bish.; Del.; Field; Gray; Kew; Par.; fruiting); *Heinrich Wawra* 2,252, Oahu, 1868–71 (Mus. V.; subflowering).

Additional specimens studied and cited by St. John but not available to me are: *Edward P. Hume* 558, shrub 10 feet tall, in small wet valley, near trail, alt. 1,800 feet, Kaluanui-Punaluu Divide, Kaluanui, Koolau Mts., May 8, 1932.

St. John's full description, based upon "abundant material of this species," has been reproduced here with few modifications. St. John appears to have overlooked the undoubtedly dioecious habit of the flowers. He ignored their unisexuality (cf. Skottsberg, Meddel. Göteborgs Bot. Trädgård 10: 153. 1936: "flowers which, to judge from the anthers . . . seem to be staminate in St. John's" [specimens]). His description apparently was drawn from staminate material at anthesis (although he cited flowering material which is seen to be pistillate) and from pistillate material in fruit. His description of the pistil refers in truth to the pistillode instead.

Labordia Cyrtandrae var. *β* **nahikuana** var. nov.

Folia plerumque paulo minora angustioraque, apice interdum magis attenuato-acuminata, infra sparsim vel secundum venas moderate denseve adpresso-setulosa; sepalis angustioribus, saepe basi excepta fere filiformi-angustatis; inflorescentiae ramorum setulis brevioribus ac minus perspicuis. Corolla circ. 2 cm. longa, lobis lanceolatis et circ. 7–8 mm. longis. Capsula ignota.

Leaves averaging somewhat smaller and narrower, at times more attenuate-acuminate at apex, sparsely or on veins moderately to densely appressed-setulose beneath; sepals narrower, from shortly above base often almost filiformly narrowed; branches of inflorescence with shorter and less conspicuous hairs. Corolla about 2 cm. long, its lobes lanceolate and about 7–8 mm. long. Capsule not seen.

Type specimen: Collected by *Joseph F. Rock*, Nahiku, East Maui, May, 1911 (Gray).

Distribution: Northeasternmost East Maui.

Specimens examined: *Charles N. Forbes* 244–*M*, Nahiku, July, 1910 (Bish.; Field; sterile); *Joseph F. Rock*, Kailua Ditch, Honomanu, May, 1911 (Bish.; Gray; staminate); *Rock*, Keanae, perhaps

same date (Field; subflowering); *Rock*, Nahiku, May, 1911 (type, Gray: cotype, Bish.; subflowering).

Rock (in herb.) had construed the Nahiku specimens as representing a new species and the other specimens as representing still another new species. The Nahiku material is seen to be only varietally distinct, however, from *Labordia Cyrtandrae*, a species unknown at the time to Rock. The remaining specimens exhibit variations in certain respects, but a comparative study of *L. Cyrtandrae* proper reveals much the same variations and indicates the unwisdom of attempting to segregate the Honomanu and Keanae plants from the Nahiku plants.

12. **Labordia Baillonii** St. John, Occas. Paps. Bish. Mus. 12: no. 8: 9, *pl. 4*. 1936; *Labordia Echitis* Baillon, Bull. Soc. Linn. Par. 1: 239. 1880 (nom. nudum).

Shrub(?); branches stout, somewhat tetragonal; bark smooth, yellowish; stipules chartaceous, intrapetiolar, united into a loose sheath 3–5 mm. tall. Leaf-petioles 1–2 cm. long, above glabrous and grooved, beneath more or less hirsutulous; blades firm-chartaceous, elliptic-ovate, at apex abruptly subacuminate, at base cuneate and tapering to the petiole, marginally entire, below paler green and sparsely subappressed-hirsutulous, 7–10.5 cm. long and 3.2–5.8 cm. wide. Inflorescence a terminal cyme, sessile, about 4–5 cm. tall, 15–18-flowered, sparsely hirsute; bractlets linear, tapering, 2–5 mm. long; pedicels 4–14 mm. long, hirsute, especially at apex. Sepals 5 or 6, 4.5–7 mm. long and two-thirds to three-fourths the length of the corolla-tube, somewhat hirsutulous towards base, outer ones 2–2.5 mm. wide, ovate-lanceolate below, long-acuminate above, palmately 5–7-nerved, the marginal nerves heavy and prominent towards tip; inner ones 1–1.5 mm. wide, lanceolate below, long-acuminate above. Corolla yellowish(?), firm, glabrous outside, sparsely hirsutulous inside at base of lobes; tube 7–11 mm. long, about 2 mm. in diameter, slightly contracted below the throat, the 5 lobes 8–10 mm. long, lanceolate-linear. Anthers narrowly oblong, acutely pointed at apex, 3.5–4 mm. long. Pistillode about 1.5 cm. long, slender-fusiform at base, with a slender style and a narrowly ellipsoid and papillose apex. Pistillate flowers and fruits unknown.

Type specimen: Collected by *Jules Remy*, no. 363*bis*, Island of Hawaii, 1851–55 (Par.).

Distribution: Known only from Hawaii.

Specimens examined: See discussion following.

Material of this species does not appear to have been collected since Remy's time. Nor have I been able to find the type itself among the specimens in Paris, although the type was studied by St. John as recently as 1936. In the complete absence of representative material among the specimens of *Labordia* studied by me, I have been compelled to rely upon St. John's carefully detailed description and satisfactory half-tone plate (loc. cit.).

13. **Labordia membranacea** H. Mann, Proc. Amer. Acad. 7: 197 (Enum. Haw. Pl. 386). 1867.

Leaf-blades variously broad-oblong to obovate, 0.8–2.7 dm. long and 4–12.5 dm. wide; cyme usually 12–24-flowered; plant native of Oahu ..... *L. membranacea sensu stricto.*

Leaf-blades oblongly or elliptically oblanceolate, 4–11 cm. long and 1.6–3.7 cm. wide; cyme 1–7-flowered; plant native of East Maui. var. *β exigua.*

Shrub about 2 meters tall or becoming a small tree; ultimate branches thick, herbaceous, terete to more or less angular, short-hispidulous with brown hairs. Stipules connected in a commonly entire ring. Leaves petiolate, petioles exalate, often stout, scurfy-pubescent, rufous, 0.6–2.5 cm. long; blades variously broad-oblong to obovate, apically acuminate, basally cuneate or rarely rounded, marginally subentire, 0.8–2.7 dm. long and 4–12.5 cm. wide, in living state rather fleshy and succulent, when dry membranaceous, dark green and shining or somewhat dull on glabrous upper surface, beneath pale and appressed-hispidulous with short and sharp, dark-rufous setulae, the principal lateral nerves more often 9–12 to each side. Cyme usually 12–24-flowered, subsessile, open or much contracted, with diverging branches, 3–5 cm. in diameter, viscous-pubescent or hirsute, dark-rufous; pedicels 2–3 mm. long at anthesis; bractlets capilliform-subulate, 1.5–3 mm. long. Calyx rufo-pubescent, about 6 mm. long, divided to near base into subequal linear or subulate lobes. Corolla externally and internally glabrous or sparsely setulose, pale-stramineous; the slender tube dilating above, 10–14 mm. long, the erect or spreading lobes half as long. Pistillode's stigmatic portion clavate, densely white-pubescent, about 5 mm. long and 1 mm. thick. Capsule ovoid-fusiform, 1.5–1.8 cm. thick, 2-valved; valves externally glabrous, distinctly carinate toward apex, about 3.8 cm. long exclusive of terminal rostrum (this 5–6 mm. long).

Type specimen: Collected by *Horace Mann* and *William T. Brigham*, no. 149, on mountains above Honolulu, Oahu, May 4,

1864–May 18, 1865 (herbarium not cited, but the Gray Herbarium and Cornell University specimens perhaps have equal claim to being considered as the type).

Distribution: "On the lee slopes of the Koolau Mountains from Nuuanu Valley eastward" (St. John, Occas. Paps. Bish. Mus. 10: no. 4: 6. 1933), Oahu.

Specimens examined: *Charles N. Forbes* 1,486–*O*, "lateral" on east side of Nuuanu Valley, March 22, 1910 (Bish.; Mo.; subflowering and fruiting); *Forbes* (with *J. C. Bridwell*) 2,438–*O*, on wet slope in dense shade, ridge, right-hand side, Waialae Iki, March 2, 1917 (Bish.; subflowering); *Francis R. Fosberg* 13,550, shrub 3 meters tall, in moist forest, alt. 500 meters, Cliff Trail, Koolau Mts., Manoa, January 17, 1937 (Bish.; Field; fruiting); *William Hillebrand*, Hawaiian Isls. (U. S.; staminate); *Hillebrand*, Palolo (Berl.; flowering and post-fruiting); *Hillebrand*, Pauoa, January, 1870 (Berl.; staminate); *Hillebrand*, Wailupe Valley, April, 1870 (Berl.; staminate); *Hillebrand & Rev. J. M. Lydgate*, Oahu (Bish.; staminate); *Hillebrand & Lydgate*, Wailupe (Bish.; pistillate); *Mann & Brigham* 149 (type collection, Corn.; Gray; subflowering); *Heinrich Wawra* 2,284, Oahu (Mus. V.; staminate).

For note as to Hillebrand's erroneous description of the capsule of this species, see under *L. olympiana* (p. 515).

The type description omits the capsules, nor does Mann's type material have them. It may be noted that Mann cited the "mountains above Honolulu" for the type station. I have therefore relied upon Forbes 1486–*O* for my description of the capsules. This collection was made on the east side of Nuuanu Valley, which extends directly and northeastwardly from the main part of Honolulu. The mature capsules have valves distinctly carinate toward their apex. In this respect they differ conspicuously from those of a form known to me definitely as yet only from the somewhat more distant Mt. Olympus, and which I must assume not to have been the form studied by Mann (*vide L. olympianam infra*).

Labordia membranacea var. *β* **exigua** Sherff, Amer. Journ. Bot. 25: 588. 1938.

Leaves smaller; petiole 0.5–3 cm. long; blade oblongly or elliptically oblanceolate, at apex acuminate, more or less gradually narrowed below middle all the way to the petiole, 4–11 cm. long and 1.6–3.7 cm. wide. Inflorescence 1–7-flowered. Calyx 7–8 mm. long. Capsule unknown.

Type specimen: Collected by *Joseph F. Rock*, Honomanu, East Maui, May, 1911 (Bish.).

Distribution: Northeastern East Maui.

Specimens examined: *Joseph F. Rock*, Waikamoi ditch trail, Ukulele, September, 1910 (Bish.; staminate); *Rock*, Honomanu, May, 1911 (type, Bish.; staminate).

Distinguished from the species proper by its smaller and proportionately narrower leaves.

14. **Labordia Degeneri** Sherff *ex* Degener, Fl. Haw. Aug. 24. 1938.

Leaves when dry a pallid bluish- or grayish-green; capsule compressed, its valves distinctly carinate nearly or quite to base. *L. Degeneri sensu stricto.*

Leaves when dry brownish-green; capsule more or less obcompressed, valves weakly or obsoletely carinate toward apex but otherwise ecarinate.....var. β subcarinata.

Shrub ±3 meters tall; branchlets gray, terete, at first hispidulous but finally more or less glabrate. Leaves disposed at ends of branchlets, the petiole variously 0.5–3 cm. long; blade more often oval or ovate, more rarely obovate, at apex abruptly contracted and acute or subacuminate, at base rounded or widely cuneate, glabrous above, sparsely or moderately appressed-hispid beneath, at least when dry a pallid bluish- or grayish-green, 2–8 cm. long and 1.5–4.3 cm. wide. Inflorescence sessile, umbellately contracted, more often 3–15-flowered, the bractlets very narrowly oblong-linear. Flowers subsessile. Calyx glabrate; lobes linear or acutely lanceolate, dorsally up to 5-nerved, marginally somewhat translucent, 5–8 (finally even 14) mm. long. Corolla outwardly glabrate; tube ±11 mm. long; lobes linear, spreading or reflexed, ±6 mm. long. Pistillode (mature) unknown. Pistil about 5.5 mm. long at anthesis; stigma slender-cylindric, ±2.8 mm. long, hispidulous on lengthwise ridges; style one-third as thick, glabrous, about 1 mm. long; ovary slenderly conic-ovoid, mostly glabrous. Capsule solitary at tip of branchlet, compressed (not obcompressed), in lengthwise outline cuneate-oblong or toward apex subobtusely and arcuately narrowed, glabrate, not shiny, about 3 cm. long, 2-valved; valves medianly carinate on dorsal surface (unless toward base), at apex very shortly rostrate, rostrum only about 1–2 mm. long.

Type specimen: Species based on two type sheets. First sheet (subflowering material): *Otto Degener*, no. 10,248, Waineke Swamp,

Kokee, Kauai, July 1, 1926 (Field). Second sheet (fruiting material): *Degener*, no. 10,252, in wet ravine, Kokee Camp, Kauai, June 25, 1926 (Field).

Distribution: Northwestern Kauai.

Specimens examined: *Degener* 10,248 (type, 1st sheet, Field: cotype, Deg.; pistillate); *Degener* 10,252 (type, 2nd sheet, Field; fruiting); *Degener* 10,256, in rain-forest, Kokee Camp, June 23, 1926 (Berl.; Deg.; Field; Gray; fruiting); *Degener* 10,257, "almost certainly Kauai," summer, 1926 (Deg.; Field; subflowering); *Mrs. Juliet Wichman* 2,940, Kalalau Trail, Kokee region, August 15, 1938 (Goth.; fruiting).

The two mature capsules on the second type sheet are brownish-black. A third capsule, somewhat less mature, is on the same sheet. This is distinctly pallid. The capsules are much the largest for the several Kauai species of *Labordia*, being approached in size only by the carinate-valved capsules of the habitally very different *Labordia Helleri* var. *macrocarpa*. This exceedingly interesting species was dedicated to Otto Degener, in grateful recognition of the important part which his numerous specimens of *Labordia* had played in facilitating my monographic research upon the genus.

Labordia Degeneri var. β **subcarinata** var. nov.

Folia sicca brunneo-viridescentia infra paulo hispidiora setis saepe brevioribus. Capsula paulo brevior, plus minusve obcompressa, valvis extus interdum plus minusve subnitidis, apicem versus aegre obsoleteve carinatis aliter ecarinatis, 2–2.6 cm. longis.

Leaves becoming brownish-green when dry, somewhat more hispid beneath with often shorter setae. Capsule a little shorter, more or less obcompressed, its valves at times more or less subglossy externally, weakly or obsoletely carinate toward apex elsewhere ecarinate, 2–2.6 cm. long.

Type specimen: Collected by *Charles N. Forbes*, no. 980–*K*, in Waimea Drainage Basin, west side, July 3 to August 18, 1917 (Bish.).

Distribution: Northwestern Kauai.

Specimens examined: *Forbes* 346–*K*, Kaholuamanu, September, 1909 (Bish.; Field; Gray; staminate); *Forbes* 980–*K*, (type, Bish.; fruiting); *Forbes* 987–*K*, Waimea Drainage Basin, west side, July 3–August 18, 1917 (Bish.; Field; Mo.; subflowering); *Forbes* 1,044–*K*, Kalalau Trail, same locality and date (Bish.; subflowering); *Francis R. Fosberg* 12,676, shrub 3 meters tall, fruits [immature] white, under

side of leaves pallid, in wet forest, alt. 1,250 meters, plateau at head of Kalalau Valley, December 29, 1935 (Field; subfruiting); *Joseph F. Rock* 5,247, Kaholuamanu, September, 1909 (Bish.; subflowering); *Rock* 5,916, same locality and date (Bish.; staminate); *Olof H. Selling* 3,101, Nualolo Trail, Kokee region, August 21, 1938 (Goth.; fruiting).

Through this variety, *L. Degeneri* makes an illusory approach to *L. pallida* var. *hispidula* of the same region. Var. *subcarinata* differs, however, in having leaves proportionately shorter, broader, more rounded and less attenuate-elongate at each end, drying more of a brownish-green instead of a yellowish-green, much less densely and finely hispid on lower surface (in *L. pallida* var. *hispidula* the midribs have, underneath their proximal half, as many as 15–30 setulae abreast, while in var. *subcarinata* this portion of the midrib is sparsely hispid, with 1–5 setae abreast); also in having capsular valves definitely though somewhat inconspicuously carinate toward apex.

15. **Labordia olympiana** Sherff, Amer. Journ. Bot. 25: 580. 1938; *Labordia membranacea* sensu Rock, Indig. Trees Haw. Isls. 405, *pl. 164.* 1913 (non Mann).

Small tree, 3–5.5 meters tall. Leaves similar to those of *L. membranacea* but perhaps less hispid with brown or dark-rufous setulae, at base more rounded, at apex less attenuated. Inflorescence few-flowered, flowers similar to those of *L. membranacea;* calyx 8–11 mm. long. Capsule bivalved, variously conic-ovoid or ovoid-fusiform or cylindric-ovoid, 2–4 cm. long and 1.1–1.8 cm. thick; valves ecarinate, at apex not or very obsoletely rostrate.

Type specimen: Collected by *Joseph F. Rock,* Mt. Olympus Trail, Oahu, 1912 (Bish., 2 sheets).

Distribution: Southeastern Oahu.

Specimens examined: *Rock,* Mt. Olympus Trail, 1912 (2 type sheets, Bish.; flowering and fruiting).

Rock (loc. cit.) included this form with *L. membranacea* Mann. His "three-flowered cyme," "valves not ridged at the back," and "Mt. Olympus trail, where it is a small tree 10 to 18 feet in height" are clearly taken from the data pertaining to the 2 type specimens of *L. olympiana.* His description of the calyx-lobes as being 1.5 cm. long is doubtless a misprint. The entire calyx of *L. olympiana* is under 11 mm. long (and in *L. membranacea* it is only ±6 mm. long).

Hillebrand (Fl. Haw. Isls. 292. 1888) seems to have been unfamiliar with this species. His description of the capsule of *L.*

membranacea Mann would falsely appear *per se* to have been drawn really from *L. olympiana's* capsule. On this point, however, his herbarium specimens of *L. membranacea* (Berl.) are conclusive. Only his Palolo specimen has any fruit at all and this a single rudiment of a year previous to that of collecting. The inflorescence had produced 3 capsules. Of these the reticulated fibrovascular system of the mostly disintegrated exocarp remains, *capped in each case by a rudiment of the capsular rostrum.* In one instance the *membranous interior shell of the capsule* persists and is evidently the basis for Hillebrand's misleading description of the capsule for *L. membranacea:* "conico-elongate, about 12 lines in height, the pergameneous valves not ridged at the back."

More material of *L. olympiana* is much to be desired, that the foliar and floral characters, as distinguished from those of *L. membranacea,* may be more closely drawn.

16. **Labordia hirtella** H. Mann, Enum. Haw. Plants no. 385 (Proc. Amer. Acad. 7: 196). 1867.

a. Leaves glabrate or finally very glabrous.

b. Principal leaves mostly under 8 cm. long and 2.5 cm. wide; plant native of Molokai.....var. *η laevis.*

b. Principal leaves mostly over 10 cm. long and 3 cm. wide; plant native of East Maui.....var. *ε haleakalana.*

a. Leaves pubescent beneath, at least along the veins.

b. Calyx-lobes more or less ovately dilated at base.

c. Calyx glabrate; plants natives of Hawaii and Molokai.

d. Upper half of sepals capilliform-subulate.var. *δ microcalyx.*

d. Upper half of sepals linear-subulate to triangular-lanceolate.

e. Leaves densely hispidulous beneath with very short hairs; plant native of Hawaii.....var. *θ imbricata.*

e. Leaves sparsely appressed-setose beneath with rather long, shining hairs; plant native of Molokai.
var. *ι laevisepala.*

c. Calyx pubescent; plant native of East Maui.
var. *ε haleakalana.*

b. Calyx-lobes not or but slightly dilated at base.

c. Leaf-blades 2.5–6 cm. long and 1–2 (–2.6) cm. wide.

d. Leaves mostly oblanceolate and rather narrowly so, densely fine-pubescent beneath; calyx externally more or less pubescent.....var. *β microphylla.*

d. Leaves obovate or at times oval-oblong to ovate, sparsely setulose beneath or glabrate except along veins; calyx glabrous or glabrate.....var. γ *sororia.*

c. Leaf-blades commonly (and at least when membranous) larger, 6–12 cm. long and 2–4.3 cm. wide.

d. Leaf-blades mostly obovate or oblanceolate.

e. Calyx pubescent.....*L. hirtella sensu stricto.*

e. Calyx glabrous.....var. ι *laevisepala.*

d. Leaf-blades ovate-oblong or scarcely oblong-subobovate; calyx glabrous or glabrate .....var. ζ *hispidior.*

Shrub or small tree, irregularly much branched; branchlets slender, sharply angular or even subalate, pubescent or all but terminal 1 or 2 internodes usually becoming glabrate; stipules low and highly variable. Leaves mostly obovate or oblanceolate more rarely oval or widely elliptic; petiole hispid, 2–15 mm. long; blade glabrate above, pubescent and pale beneath, at apex short-acuminate, below middle more or less cuneately narrowed, now coriaceous and small (3–6.5 cm. long and 1.2–2.5 cm. wide) now membranous and larger (up to 12 cm. long and to 4.3 cm. wide). Cyme 3–9 (in Molokai material to 20)-flowered, open and loose, its spreading-hispid branches rather long and slender and mostly reflexed, ultimate pedicels mostly 3–7 mm. long at anthesis, their slender filiform-linear pubescent bractlets about 4 mm. long. Calyx pubescent, 0.3–0.5 the length of the corolla-tube, cleft to the base into the 5 linear-lanceolate (or even filiform-linear) finely acuminate or subulate lobes, these at anthesis 4–7.5 (–9) mm. long. Corolla pale yellow, glabrous outside and inside, the tube 10–12 (–16) mm. long, the slender acute lobes about 5–6 (–10) mm. long. Pistillode's style very filiform and protruding 6–8 mm. above calyx, ending abruptly in the narrowly obovoid stigma, this about 2 mm. long. Capsule ovoid-elongate, somewhat conical toward apex, 2-valved, minutely and subsparsely appressed-hispidulous, 2.3–2.7 cm. long (including the stylar beak of 2–3 mm.) and 8–10 mm. thick, valves rounded and not carinate.

Type specimen: Collected by *Horace Mann* and *William T. Brigham*, no. 335, on the summit of Lanai, 1864–1865 (herbarium not cited; the Gray Herbarium and Cornell University Herbarium specimens would of course have best claims to being considered the type, although this is of little consequence, since the various specimens of the type number, 335, are identical).

Distribution: Lanai, eastern Molokai, and Maui.

Specimens examined: *Otto Degener* 10,273, shrub 2–4 feet tall, in rain-forest, Mapulehu, almost overlooking Wailau Valley, Molokai, June 9, 1928 (Berl.; Deg.; Field, 2 sheets; fruiting); *Degener* 10,277, in rain-forest, East Fork of Kawela Gulch, Molokai, June 11, 1928 (Field; subfruiting); *Charles N. Forbes* 369–*L*, Lanai, September, 1917 (Bish.; sterile); *Forbes* 2,544–*M*, Halehaku Ridge, right side of valley, northern East Maui, June 16, 1920 (Bish.; sterile); *Forbes* 2,586–*M*, west bank of Honomanu Gulch, northeastern East Maui, June 23, 1920 (Field; staminate); *Forbes* 2,588–*M*, trail up west bank of Honomanu, same date (Bish.; Field; staminate); *William Hillebrand*, Hawaiian Isls. (Mus. V.; subflowering); *Hillebrand*, Lanai, 1870 (Berl.; Gray; staminate); *Hillebrand*, Lanai, July, 1870 (Berl.; staminate); *Hillebrand*, Molokai (U. S.; subflowering and fruiting); *Hillebrand*, Molokai, 1870 (Gray; subflowering and fruiting); *Hillebrand*, heights near Pali of Pelekunu, Molokai, July, 1870 (Berl.; fruiting); *Hillebrand*, Maunahui, Molokai, June, 1870 (Berl.; subflowering); *Hillebrand & Rev. J. M. Lydgate* 97, West Maui (Bish.; staminate); *Mann & Brigham* 335 (type collection: Corn.; Gray; Mo.; U. S.; flowering and fruiting); *George C. Munro* 237, Lanaihali, Lanai, June 29, 1915 (Bish.; staminate); *Joseph F. Rock*, Molokai (Bish.; staminate); *Rock*, Wailau Pali, Molokai, 1910 (Mus. V.; fruiting); *Rock* 7,045, alt. 2,750 feet, dense forest, Wailau Pali, Molokai, April 15, 1910 (Bish., 2 sheets; Gray; fruiting); *Rock* 7,069, stunted shrub 4–5 feet tall, trail to Wailau Pali, Molokai, April, 1910 (Bish., 2 sheets; Gray; Mus. V.; subflowering).

At first sight, the Molokai material seems varietally distinct from Mann and Brigham's type collection on Lanai, in having larger leaves and larger and more numerous flowers (12–20 in a cyme instead of 3–11). Hillebrand, however, collected a perfectly connecting range of intermediate specimens on the small type island, Lanai, and on studying these one is compelled to follow Hillebrand (loc. cit.) and J. F. Rock (*in herb.*) in regarding the Molokai and Lanai (and the above cited Maui) specimens as identical.

Labordia hirtella var. β **microphylla** Hillebr. Fl. Haw. Isls. 292. 1888.

Leaves numerous, mostly oblanceolate and rather narrowly so, tapering into a somewhat elongately acuminate apex, blade 3–6 cm. long and 1–2 (–2.5) cm. wide, densely fine-pubescent beneath. Corolla tube 6–9 mm. long. Capsule 2 cm. long, on more or less

elongate (±3 cm.) pedicel, the 2 valves slightly but distinctly carinate at apex.

Type specimen: Collected by *William Hillebrand*, Kaanapali, West Maui, August, 1870 (Berl.).

Distribution: Known only from type locality in extreme-western West Maui.

Specimens examined: *Hillebrand*, Kaanapali, West Maui, August, 1870 (type, Berl., staminate and fruiting: staminate flowering branch from type, U. S.); *Hillebrand & Rev. J. M. Lydgate*, West Maui (Bish.; subflowering).

Labordia hirtella var. γ **sororia** Sherff, Amer. Journ. Bot. 25: 582. 1938.

Leaves numerous, obovate or at times oval-oblong to ovate, at apex subabruptly or somewhat gradually acuminate, sparsely setulose beneath or glabrate except along the veins, mostly 2.5–5 cm. long and 1.3–2.6 cm. wide. Pedicels (at least above) and sepals glabrate. Corolla tube slender or thick (1.2–3 mm.), 8–10 mm. long. Anthers of sterile flowers cream-white, linear, about 2.2 mm. long. Pistillode spreading-pilose below with whitish hairs, its filiform stylar portion protruding in age 4–4.5 mm. past sepals and ending in a linear or narrowly obovoid stigmatic portion about 2.5 mm. long.

Type specimen: Collected by *Joseph F. Rock*, no 8,152, altitude of 4,000 feet, Honokowai Gulch, West Maui, August 24, 1910 (Bish.).

Distribution: Central and northwestern West Maui.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 2,671 *pro parte*, Puu Kukui, July 26, 1938 (Goth.; staminate); *Charles N. Forbes* 103–*M*, Iao Valley, West Maui, June, 1910 (Berl.; Bish.; Field; Gray; Kew; Mo.; Par.; staminate); *Joseph F. Rock* 8,151, Hawaiian Isls. (Bish.; subfruiting); *Rock* 8,152 (type, Bish.: cotypes, Berl.; Field; Gray; Kew; Mus. V.; staminate); *Rock* 8,180, West Maui (Bish., 2 sheets; staminate).

Labordia hirtella var. δ **microcalyx** Hillebr. Fl. Haw. Isls. 292. 1888.

Leaves large, obovate to oblanceolate, subabruptly acuminate, more membranous, pale and subappressedly hispid underneath, blade 7–15 cm. long and 2.6–5.5 cm. wide, petiole mostly only 5–10 mm. long. Calyx glabrate, its lobes 3.5–5 mm. long, ovately dilated below (and narrowly linear above) middle; pedicel sparsely to moderately hispid. Corolla-tube slender, 1–1.2 cm. long. Pistillode

white-hairy below, its filiform style protruding about 7 mm. above calyx; stigmatic portion narrowly oblong, about 2.2 mm. long.

Type specimen: Collected by *Rev. J. M. Lydgate*, in woods, Hilo, Hawaii, April, 1871 (Berl.).

Distribution: Known only from type locality in northeastern-most Hawaii.

Specimens examined: *William Hillebrand & Rev. J. M. Lydgate*, Hilo, Hawaii (Bish.; staminate); *Lydgate*, woods, Hilo, April, 1871 (type, Berl.: type fragment, U. S.; staminate).

Labordia hirtella var. ϵ **haleakalana** Sherff, Amer. Journ. Bot. 25: 582. 1938.

Branchlets conspicuously corky-winged. Leaves oblong or obovate, abruptly short-acuminate, blade 5–15 cm. long and 2.5–6.5 cm. wide, minutely somewhat pubescent beneath, especially along veins; petiole glabrous or glabrate, 5–14 mm. long. Calyx as in var. *microcalyx* but pubescent. Corolla-tube slender, 12–14 mm. long. Pistillode's style extending ±9 mm. past the calyx, the stigmatic enlargement at apex linear-oblong and ±3.2 mm. long. Capsule glabrate, up to 3.7 cm. long.

Type specimen: Collected by *Joseph F. Rock*, no. 8,626, "Ukulele Waikamoi Haleakala," East Maui, October, 1910 (Bish.).

Distribution: Northeastern East Maui.

Specimens examined: *Otto Degener*, sine num., in extreme rain-forest, Koolau Gap, Haleakala Crater, June 17, 1927 (Field; fragment, subflowering); *Degener* 10,262, in rain-forest along Pipe-Line Trail, Olinda, July 30, 1927 (Field; staminate); *Degener* 10,265, same locality, June 21, 1927 (Berl.; Deg.; Field; flowering and post-fruiting); *Degener* 10,269, same locality, June 20, 1927 (Berl; Deg.; Field; fruiting); *Degener* 10,271, in dense rain-forest, same locality, June 16, 1927 (Berl.; Deg.; Field; staminate; teratological material, flowers closely aggregated in small clusters; leaves and calyx glabrous); *Degener* 10,302, same locality, June 17, 1927 (Berl.; Deg.; Field; subfruiting); *Charles N. Forbes* 160–*M*, in woods near Ukulele, above Olinda, July, 1910 (Bish.; Field; fruiting); *Forbes* 207–*M*, in woods above Olinda, July, 1910 (Bish., 2 sheets; staminate); *Forbes* 741–*M*, Ukulele, July, 1919 (Bish.; fruiting); *Forbes* 750–*M*, same locality and date (Bish.; subflowering); *Forbes* 925–*M*, same locality, July 25, 1919 (Bish.; subflowering); *Forbes* 1,153–*M*, north slope of Haleakala, August 15, 1919 (Bish.; subflowering); *Rock* 8,626 (type, Bish.: cotype, Gray; staminate).

Labordia hirtella var. ζ **hispidior** Sherff, Amer. Journ. Bot. 25: 582. 1938.

Branchlets densely antrorse-hispid. Petioles more often very hispid, ±1 cm. long; blades ovate-oblong or scarcely oblong-subobovate, at apex acuminate, at base widely cuneate, on upper surface glabrous, on lower surface distinctly hispid with setae arcuate and (when dry) straw-colored, 6–8 cm. long and 2–3.5 cm. wide. Inflorescence loose, ±20-flowered. Calyx glabrous or glabrate, 7–8 mm. long. Pistillode's style hardly or slightly surpassing the sepals; its stigma slenderly cylindric, ±4 mm. long. Capsule not known.

Type specimen: Collected by *Charles Noyes Forbes*, no. 43–*M*, Hanakaoo, West Maui, May, 1910 (Bish.).

Distribution: Known only from type locality in westernmost West Maui.

Specimens examined: *Forbes* 43–*M* (type, Bish.; staminate); *Joseph F. Rock* 8,153 *pro parte*, Honokawai, August, 1910 (Bish.; subflowering).

Rock collected three specimens under his no. 8,153. One of them is cited here but a second (the third, while vegetatively matching the second, is sterile) is distinguished quickly by its larger and more strongly nerved sepals and must be referred to *L. Hedyosmifolia* var. *centralis*. It is interesting to note that Hillebrand (Fl. Haw. Isls. 292. 1888) experienced difficulty in separating *L. hirtella* at times from *L. Hedyosmifolia*. Thus he wrote: "In Lanai, where both it and the latter species [our *L. Hedyosmifolia* var. *centralis*] occur together, it is often difficult to assign a flowering specimen to one or the other on account of the variable length of the calycine lobes."

Labordia hirtella var. η **laevis** Sherff, Amer. Journ. Bot. 25: 582. 1938.

Branchlets more or less curly-winged; leaves glabrate or finally very glabrous.

Type specimen: Collected by *Joseph F. Rock*, no. 16,012, Kamoku, Molokai, April, 1918 (Bish.).

Distribution: Known only from type locality on southern slope of eastern Molokai.

Specimens examined: *Rock* 16,012 (type, Bish.; staminate).

Labordia hirtella var. θ **imbricata** Degener & Sherff, var. nov.

Sepala plus minusve glabrata; demum ±1 cm. longa, graciliter 3- vel 5-nervata, diaphano-marginata, ovato-lanceolata, infra dilatata imbricataque.

Sepals more or less glabrate; when fully developed ±1 cm. long, delicately 3- or 5-nerved, diaphanous-margined, ovate-lanceolate, below the middle dilated and overlapping.

Type specimen: Collected by *Otto Degener*, no. 10,253, ravine *mauka* of road at elevation with considerable rainfall, along road 17 miles from Kohala toward Waimea, Hawaii, August 14, 1926 (Field).

Distribution: Known only from type locality in northwestern Hawaii.

Specimens examined: *Degener* 10,253 (type, Field: cotypes, Berl.; Deg.; subflowering and subfruiting).

The slender, elongate, immature capsules examined in the type collection are essentially glabrous and up to 2.9 cm long.

Labordia hirtella var. ι **laevisepala** Degener & Sherff, var. nov.

Inflorescentia ramulis pedicellisque brevioribus minus aperta vel expansa. Calyx glaber vel inferne interdum sparsim hispidulus, plerumque 4–6 mm. altus; sepalis supra subulatis infra lanceolatis vel saepius ovato-subdilatatis margine angusto-diaphanis. Corolla brevior, tubo 6–8 (rarius –12) mm. longo.

Inflorescence less open or expanded, because of the shorter branchlets and pedicels. Calyx smooth, or at times sparsely hispidulous below, commonly 4–6 mm. tall; sepals subulate above, lanceolate or more often ovate-subdilated below, narrowly diaphanous at the margin. Corolla shorter, its tube 6–8 (more rarely –12) mm. long.

Type specimen: Collected by *Otto Degener*, no. 10,280, growing about 6 feet tall, inflorescence drooping, corolla pale yellow, in rainforest, at upper end of Hanalilolilo Pipe-Line, Molokai, April 24, 1928 (Field, 2 sheets).

Distribution: Known only from type locality in eastern Molokai.

Specimens examined: *Degener* 10,280 (type, 2 sheets, Field: cotypes, Berl.; Deg.; staminate).

17. **Labordia waialealae** Wawra, Flora 55: 516. 1872; op. cit. 58: 286. 1875.

Densely branched shrub about 1.2–1.8 meters tall; woody parts grayish-brown at least when dry, pubescent; branchlets divaricate, slender and mostly very nodose, the comparatively delicate internodes numerous and often only 3–7 mm. long. Leaves petiolate; blade oval to obovate, apically rounded and at times short-acuminate, basally more or less cuneate, thin, often drying with a bluish-gray to

bluish-black color, in live state light green and on upper surface glistening, glabrous or on lower surface (especially on nerves) somewhat hispidulous, usually 1–2.5 cm. long but at times 5–7 cm. long and 3–4 cm. wide, often revolute; principal lateral nerves commonly 3 or 4 to a side; petiole slender or margined, up to 12 mm. long; stipules externally pubescent, internally glabrous and shining. Flowers mostly 3–20 in terminal cymes (occasionally solitary or clustered at tip of dwarf lateral branchlet and then perhaps seemingly axillary); fruiting pedicles blackish, pubescent below, about 6 mm. long; bractlets linear-filiform, 2–4 mm. long. Sepals linear-subulate, marginally more or less hyaline, glabrous or glabrate, obscurely nerved, 4–5 mm. long and mostly less than 1 mm. wide; corolla yellow, 8.5–10 (rarely –17) mm. long, glabrous or very remotely white-setulose outside, hispidulous within, the lobes irregularly 1–3.5 (–7) mm. long, tube 4.5–7.5 (–10) mm. long; anthers slightly exserted; pistillode extending about halfway up corolla-lobes, its sometimes slightly or very deeply cleft stigma slenderly cylindric and ±3 mm. long; pistil drying black or blackish, at anthesis pubescent and ±8 mm. long; ovary cylindric-fusiform, at first surpassed by calyx, 2-carpellate, soon glabrous or merely beset with a few white setae; style short (up to 2 mm.), equaling or exceeding the erect stigmata; capsule ovoid, smooth, dehiscent now from the apex downward now from the base upward, about 13 mm. or with persistent style about 15 mm. tall, the valves cristate-carinate at top; pulp copper-colored to orange-colored.

Type specimen: Collected by *Heinrich Wawra*, no. 2120, somewhat rare, in woods at the side of Waialeale toward the sea, Kauai, 1868–1871 (Mus. V.).

Distribution: Kauai, vicinity of Alakai Swamp; also in southeastern Molokai if we may rely upon the accuracy of the label for Faurie's plant.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 2,827, Kilohana, north end of Alakai Swamp, August 13, 1938 (Goth.; post-fruiting); *Cranwell, Selling, & Skottsberg* (similarly) 2,827, trail to Lehuamakanoi, August 16, 1938 (Goth.; staminate); *Cranwell, Selling, & Skottsberg* 2,975, in forest near Kawaikoi Stream, near northwestern corner of Alakai Swamp, August 16, 1938 (Goth.; fruiting; the dried pulp orange-colored, whence Wawra's description of the pulp, "aeruginea," is seen to mean copper-colored rather than, as given in the dictionaries, the color of copper-rust, that is, greenish); *Otto Degener* 10,249, small

bush about 4 feet tall, not in wet situation, Waineke Swamp, Kokee, Kauai, June 28, 1926 (Deg.; Field, 2 sheets; staminate); *Degener* 10,250, same locality and date (Deg.; Field; staminate, pistillode about 13 mm. long, its slender style about 3 mm. long, stigma about 4.3 mm. long and 1 mm. thick, in one of the 3 flowers examined cleft almost to its base); *Abbé Urbain Faurie* 452, Kamalo (spelled Kamolo by Faurie), Molokai, June, 1910 (Bish.; sterile, but differing vegetatively in no way from Kauai specimens); *Charles N. Forbes* 331–*K*, Kaholuamanu behind Waimea, Kauai, September, 1909 (Berl.; Bish.; Field; Gray; Kew; Mo.; pistillate, flowering and subfruiting); *Forbes* 405–*K*, same locality and date (Bish.; Field; staminate and post-fruiting); *Forbes* 896–*K*, Alakai Swamp, Kauai, July 3–August 18, 1917 (Berl.; Field, 2 sheets; Gray; Kew; in vegetative state); *Forbes* 904–*K*, same locality and date (Bish.; staminate); *Forbes* 910–*K*, same locality and date (Berl.; Bish.; Field; subflowering); *Francis R. Fosberg* 12,756, shrub 1.5 meters tall, alt. 1,200 meters, wet forest, Alakai Swamp, near Lehuamakanoi, Kauai, January 3, 1936 (Field; staminate); *Albert S. Hitchcock* 15,459, alt. 3,600–5,080 feet, Waialeale, Kauai, October 22–24, 1916 (U. S.; staminate); *Joseph F. Rock* 4,873, woods of Kaholuamanu, Kauai, September, 1909 (Bish.; subflowering); *Rock* 5,250, Kaholuamanu, September, 1909 (Bish.; in vegetative state); *Rock* 5,251, Lehuamakanoi Ridge, Kauai, September 6, 1909 (Gray; subflowering); *Rock* 5,252, same locality (Bish.; staminate); *Rock* 5,892, trail to Lehuamakanoi, September 6, 1909 (Field; subflowering); *Rock* 5,894, trail to Kahana Valley, Kauai, September 10, 1909 (Bish.; staminate); *Rock* 5,898, Ridge of Lehuamakanoi, Kauai, September 6, 1909 (Bish.; staminate); *Rock* 5,899, Kaholuamanu Forest, Kauai, September 6, 1909 (Bish.; staminate); *Rock* 8,885, Waialeale, Kauai, October, 1911 (Bish., 2 sheets; Gray; in vegetative state); *Carl Skottsberg* 959, Alakai Swamp, Kauai, October 27, 1922 (Goth.; vegetative); *Harold St. John, Edward Y. Hosaka, Edward Hume, et al.* 10,734, Na Pali-Kona Forest Reserve, northwest end of Alakai Swamp, Kauai, December 27, 1930 (Bish.; N. Y.; fruiting); *Wawra* 2,120, somewhat rare, side of Waialeale toward the sea, Kauai, end of December, 1869, to May 1, 1870 (type fragment, Goth.; fruiting).

There is evident a high degree of habital, especially foliar polymorphism among the specimens included here under *L. waialealae*, in fact so much so that originally I attempted to differentiate the forms into two or more species or varieties, though without success. Recently (1938) Skottsberg restudied the plants in their native

habitat and concluded at least provisionally that there were two distinct forms. On receipt of word from him to this effect, I reconsidered my above treatment but was again unable to accomplish a segregation. Under date of March 22, 1939, Dr. Skottsberg writes: "As regards the two forms of *Labordia waialealae*, which you find it impossible to distinguish, they are so unlike each other when alive that they cannot be confused, but I suppose the flowers are identical." One can only hope that the matter of species delimitation here will be investigated by future field workers, who certainly should give serious consideration to the possibilities of hybridization and to the effect of unlike growth conditions.

18. **Labordia Lydgatei** C. N. Forbes, Occas. Paps. Bish. Mus. 6: 176 and plate. 1916.

Shrub or small tree, branchlets pubescent and angulate. Leaves more or less cuneately narrowed below into a very short (2–4 mm.) or long (5–15 mm.) sparsely hispidulous petiole; blade elliptical or broadly oblanceolate to narrowly obovate, acuminate at apex, glabrous above, moderately appressed-hispidulous beneath, 5–10 cm. long and 2–3 cm. wide. Cyme open, delicate, irregularly pilose, 6–21-flowered, branches and ultimate pedicels capillary. Calyx glabrous, about 2 mm. tall, parted to near base into basally triangular-ovate upwardly linear-subulate sepals. Corolla glabrous externally, pilose internally, pale yellow, its slender tube 4–5 mm. long; lobes linear-subulate, 2–3 mm. long. Capsule globose, smooth, not winged, 2-valved, 4 mm. thick.

Type specimen: Collected by *Charles N. Forbes*, no. 179–*K*, on ridges near the swamp, Wahiawa Drainage Basin, Kauai, August, 1909 (Bish.). Forbes cited Lydgate's specimen before his own, and had to rely upon the Lydgate plant for the fruiting characters. His illustrative plate was taken from his own no. 179–*K*, however, and his citation of "ridges near the swamp" for the type locality, shows that he had in mind as his type this same collection number (Lydgate gave merely "Wahiawa Mts." for the locality).

Distribution: Known only from type locality in southernmost Kauai.

Specimens examined: *Forbes* 179–*K* (cotype, Field; staminate); *Forbes* 204–*K*, Wahiawa Mts., August, 1909 (Field; Mo.; staminate); *Rev. J. M. Lydgate*, same locality (Bish.; staminate).

My description of the capsule is taken entirely from Forbes' original text, based upon a fruiting specimen collected by Lydgate,

not seen by me. Forbes remarks upon the small size of the capsule, stating that it is smaller than that of any other species of *Labordia* known to him. It may be added that the minute calyx and corolla, also the capillary branches of the delicate cyme, are additional diagnostic characters of value. The leaves apparently tend to dry blackish on their upper surface.

19. **Labordia Helleri** Sherff, Amer. Journ. Bot. 25: 581. 1938; *Labordia Tinifolia* var. γ Hillebr. Fl. Haw. Isls. 293. 1888 (as to description and first cited material, a specimen from Kauai, found to be *Knudsen* 199 in the Hillebrand herbarium at Berlin).

Capsules about 1.2–1.3 cm. long.....*L. Helleri sensu stricto.*
Capsules 1.5–2.4 cm. long.....var. β *macrocarpa.*

Shrub or medium-sized tree, glabrous; branches more or less grayish, terete, scarcely divaricate. Leaves upwardly somewhat close together, petiolate with petioles slender and 7–15 mm. long; blades membranaceous, elliptic-oblong or obovate-oblong, pallid, at apex shortly acuminate, at base cuneately contracted, at margin entire or very obsoletely denticulate, smooth, 4.5–10.5 cm. long and 1.7–4 cm. wide; principal lateral nerves subobsolete, very delicate, commonly 5–7 to a single side. Flowers paniculate-cymosely disposed, ±25 in an inflorescence; branches of inflorescence opposite, delicate, glabrous, divaricate; peduncle 0.5–2 cm. long, pedicels finally ±1 cm. long. Calyx glabrous, about 2 mm. tall; lobes ovate-cordate, at apex acute, at margin conspicuously straw-yellow, at base more or less auriculate, at least 1 mm. long. Corolla thickish-cylindric; tube externally glabrous, internally white-pilose, 6–8 mm. long and up to 2.5 or at the throat to 3 mm. thick, sometimes upwardly narrowed; lobes cordate-ovate, spreading, acute, marginally straw-colored when dry, about 1.7 mm. long; anthers slightly exserted; pistillode's head exserted for half its length. Pistillate flowers unknown at anthesis. Capsules ovoid, at apex conspicuously and very sharply mucronate, about 12–13 mm. long, bivalved; valves longitudinally and reticulately veined on outer surface.

Type specimen: Collected by *Amos Arthur Heller*, no. 2,579, on the ridge west of the Hanapepe River, Kauai, July 17, 1895 (Field).

Distribution: Haupu Range to west of the Hanapepe River, southeastern Kauai.

Specimens examined: *Heller* 2,579 (type, Field: cotypes, Berl.; Bish.; Corn.; Gray; Kew; Minn.; N. Y.; Par.; Petrop.; fruiting at Gray and N. Y., elsewhere staminate); *Heller* (similarly) 2,579,

ridge west of Hanapepe River, August 22, 1895 (Mo., 1 sheet of staminate and 1 sheet of fruiting material; N. Y., staminate; U. S., staminate and fruiting on same sheet); *Valdemar Knudsen* 199, Kauai (herb. Hillebrand in Berl.; fruiting); *St. John, Hosaka, Hume, et alii* 10,990, tree 20 feet tall, alt. 800 feet, Napali Coast, Hanakapiai, January 2, 1931 (Berl.; Bish.; Field; fruiting); *St. John, Fosberg, Oliveira* 13,810, slender shrub 8 feet tall, flowers white, pendulous, hairy inside, alt. 3,600 feet, Kumuwela Ridge, Waimea, December 28, 1933 (Berl.; Bish.; Field; Par.; staminate).

Easily distinguishable from *L. Tinifolia*, with which it has heretofore been confused, by the shape and yellowish margins of its calyx-lobes and by the acutely ovoid fruits, these being (under a lens) conspicuously and reticulately lengthwise-veined. The existence of a variety (*macrocarpa*) with comparatively gigantic fruits but with the same peculiarities of shape and external venation to the fruits lends additional support (if such be needed) to the segregation of this form as a distinct species.

Hillebrand (loc. cit.) described his *L. Tinifolia* var. γ in the few words: "Capsules ovoid, acute, 6‴ long." He cited "Kauai! Maui! *Kaanapali;* Lanai! leaves small obtuse, almost rounded at the base; Hawaii!" for the distribution.[1] The Lanai material, as also that from Hawaii and West Maui, has been separated by me as *L. Tinifolia* var. *lanaiensis*.

The material from the first cited locality, i.e., Kauai, is still extant in Hillebrand's herbarium (Berl.). It was collected by Knudsen, no. 199, and matches Heller's specimens closely. Heller (Minn. Bot. Studs. 1: 877. 1897) stated that his specimens were obtained "from a medium-sized tree" in July.

Labordia Helleri var. β **macrocarpa** Sherff, Amer. Journ. Bot. 25: 582. 1938.

Shrub or small tree ±4.5 meters tall. Capsules acute, oblongly or lanceolately ovoid, more often 1.5–2.4 cm. long.

Type specimen: Collected by *Amos Arthur Heller*, no. 2,868, on Kaholuamanu above Waimea, Kauai, October 1–8, 1895 (U. S.).

Distribution: Kauai.

Specimens examined: *Charles N. Forbes* 378–*K*, Kaholuamanu, behind Waimea, September, 1909 (Bish.; Field; Kew; flowering and

[1] His Lanai material itself (Berl.) enables us to recast the ambiguous and misleading description of its leaves to read: *leaves small, their base obtuse or almost rounded.*—They are not obtuse at the apex.

fruiting); *Forbes* 721–*K*, Haupu Range, left-hand side of Kipu Kai Gap, November 1, 1916 (Field; Mo.; fruiting); *Forbes* 962–*K*, Waimea Drainage Basin, west side, July 3–August 18, 1917 (Bish.; Field; Par.; fruiting); *Forbes* 1,133–*K*, same locality and date (Bish.; fruiting); *Heller* 2,868 (type, U. S.: cotypes, Field; Gray; Mo.; N. Y.; fruiting); *William Hillebrand*, Hawaiian Isls. (U. S.; fruiting); *Joseph F. Rock* 5,887, trail to Opaewela, Kaholuamanu, September, 1909 (Bish.); *Rock* 5,888, Kaholuamanu, September 7, 1909 (Bish.; Gray; Mus. V.; fruiting); *Rock* 5,890, trail to Opaewela, Kaholuamanu, September, 1909 (Bish.); *Rock* 5,891, same locality and date (Bish.); *Rock* 5,912, growing as a shrub, trail to Opaewela Stream near Kaholuamanu, September 7, 1909 (Bish.); *Rock* 17,103, Kaholuamanu, October, 1916 (Bish., 3 sheets; fruiting).

Heller (Minn. Bot. Studs. 1: 876. 1897) doubtfully referred his no. 2,868, which constitutes the basis of var. *macrocarpa*, to *Labordia pallida*, with which it has very little in common. His specimens were collected "from a small tree, about fifteen feet high, with slender trunk, and spreading top." His printed labels all give October 1–8 as the date of collection, but his published discussion (loc. cit.) gives the date as September 25.

20. **Labordia triflora** Hillebr. Fl. Haw. Isls. 293. 1888.

Glabrous shrub or small tree with habit as in *L. Tinifolia*. Leaves subsessile to shortly petiolate with petioles mostly 1–2 mm. long; blades commonly ovate- sometimes obovate-oblong, cordate or emarginate at the rounded or truncate base, acuminate at apex, thin, 7–8.5 cm. long and 2.5–4 cm. wide, principal lateral nerves about 7 to each side. Cyme commonly 3-flowered, with delicate often cernuous peduncle of 3–5 cm. in length; pedicels subequal, 1.2–3 cm. long, minutely bracteolate at or near their middle, the median one sometimes branching to bear 2 or 3 flowers. Calyx and corolla as in *L. Tinifolia*, but the corolla's tube 10–12 mm. long. Capsule more or less elongately conic-ovate, apically pointed with a rostrum about 1 mm. long, 0.9–2 cm. tall, 2-valved, drying a blackish-brown at maturity.

Type specimen: Collected by *William Hillebrand*, Mopulehu (Mapulehu), Molokai, July, 1870 (Berl.).

Distribution: Known only from type locality in southeastern-most Molokai.

Specimens examined: *Hillebrand*, Molokai (Berl.; Gray; U. S.; fruiting); *Hillebrand*, Mapulehu, July, 1870 (type, Berl.; fruiting).

Hillebrand describes the capsules as 1.4–2 cm. (7–10 lines) long, but two sheets examined (Berl.; U. S.) have some mature capsules less than 1 cm. long, offering an approach somewhat to the capsules of *L. Tinifolia*. However, the fewer flowers or fruits, the cordate bases of the leaves, and the elongate peduncle all afford a ready distinction from *L. Tinifolia* and its varieties.—Staminate specimens are lacking in herbaria.

21. **Labordia Tinifolia** A. Gray, Proc. Amer. Acad. 4: 322. 1860.

a. Principal leaves mostly obtuse to subacute at apex, not acuminate.

b. Leaf-petioles 1–1.8 cm. long, their length usually more than half the blades' width; plant native of northwestern Oahu.
var. δ *waialuana.*

b. Leaf-petioles mostly 4–10 mm. long, their length usually less than half the blades' width.

c. Leaves numerous, appearing crowded toward tips of branchlets, mostly obovate, plant native of East Maui.
var. ζ *Euphorbioidea.*

c. Leaves fewer and not crowded, oblong or broadly oblong-oval or a few somewhat obovate; plant native of Lanai.
var. ε *lanaiensis.*

a. Principal leaves mostly acute to acuminate at apex.

b. Blades of principal leaves 2.5–4 cm. long, at apex sharply acuminate; plant native of northern Molokai.
var. β *parvifolia.*

b. Blades of principal leaves 4–18 cm. long.

c. Leaves mostly lanceolate or elliptic-oblanceolate.

d. Leaf-blades mostly under 5 cm. long; plant of southeastern Oahu.....var. κ *honolulensis.*

d. Leaf-blades mostly over 5 cm. long; plants of Molokai.

e. Leaves attenuate-acuminate at apex, flowering cymes paniculate; plant of eastern Molokai..var. η *Forbesii.*

e. Leaves barely acuminate at apex, flowering cymes subcorymbose; plant of central Molokai.
var. ι *tenuifolia*

e. Leaves barely acute at apex, flowering cymes paniculate; plant of Kauai..... var. θ *microgyna.*

c. Leaves mostly broader, at apex acute or moderately acuminate.

d. Corolla-tube at anthesis commonly dilated toward base; capsules usually more ovoid-globose or obovoid-globose, ripening commonly a dull or grayish black, mostly 6–9 mm. long.....*L. Tinifolia sensu stricto.*

d. Corolla-tube slender below; capsules usually very globose and ripening very black, 4–6 mm. long.

var. γ *leptantha.*

A small tree 6–8 (or even 15) meters tall, glabrous; bark "dark brown," "closely and deeply corrugated, the furrows . . . not straight but" seeming "to encircle the trunk, somewhat cork-screw fashion" (Rock); branches slender, terete, pale; branchlets usually terete or subterete. Leaves petiolate, petiole slender or margined above with the somewhat decurrent blade, 4–15 mm. long; blade elliptic-oblong to obovate-oblong, acute or acuminate at both ends, thin, very glabrous, often slightly repand, 5.5–11 cm. long and 1.8–4.8 cm. wide. Interpetiolar stipular body thin, concave or convex or of uniform height on upper edge, glabrous or occasionally pubescent externally, commonly setulose at top. Flowers many in a paniculate cyme 3.5–10 cm. long, this with a peduncle 1–3.5 cm. long, its primary branches opposite and rather distant, the ultimate pedicels 6–18 mm. long, the subulate bractlets about 2 mm. long. Calyx 2.5–3 mm. long, divided to nearly or about the middle into 5 triangular-subulate lobes, these spreading or reflexed in fruit, not or at most obscurely scarious-margined; corolla greenish, salver-shaped; its tube dilated below (where often 2–2.5 mm. thick at anthesis), glabrous or sparsely hispidulous outside, pubescent within, 6–8 (in West and East Maui specimens at times only 3.5–5) mm. long, the triangular-ovate lobes about one-third as long. Pistil at anthesis 5–8 mm. long, shorter than or at times somewhat surpassing corolla-tube, resembling pistillode of other species; stigma entire or slightly cleft at apex, cylindric-clavate, minutely setulose in lengthwise lines, about 2 mm. long, often passing imperceptibly (except as to pubescence) into glabrate and frequently bent or twisted style (this 1–3 mm. long); ovary narrowly conic to ovoid, nearly or quite glabrous (but often irregularly pilose over small areas), ±2 mm. long. Pistillode usually pubescent (at anthesis) ±8 mm. long and usually somewhat exserted; ovary linear, hispid near base, ±2.5 mm. long; style nematoid, more or less glabrous, 2–4 mm. long; stigma obconic-clavate, ±3 mm. long. Capsule globose or ovoid-globose or somewhat obovoid-globose, obtuse-rotund at top except for tiny stylar rostrum,

5–9 mm. tall, commonly 2- very rarely 3-valved, the valves dorsally rounded and with median nerve faint or obsolete.

Type specimen: Gray's original text gives, "Sandwich Islands, in Kauai, Maui, Oahu, and Hawaii (coll. Expl. Exped., and coll. Remy)." Gray's description of the fruit, "capsula globosa," enables us at once to exclude Kauai material, which may now be referred to *L. Helleri* or its variety *macrocarpa* (Gray apparently had not seen fruiting material from Kauai). The Maui citation is represented by *Jules Remy* 360,[1] consisting of two specimens of abundantly flowering material, labeled in Gray's own handwriting (Herb. Gray). This is closely matched by a fruiting specimen on the same sheet and likewise under Remy's no. 360, from the Island of Hawaii. All three specimens have rather definitely peduncled inflorescences, the peduncles being about 1 cm. long. A sheet of identical fruiting material collected by the United States Exploring Expedition (Herb. U. S.) and likewise labeled in Gray's own handwriting, gives merely "Sandwich Islands" for the locality. Hence *Remy* 360, from Maui and Hawaii, 1851–1855 (Gray) may well be taken as the type.

Distribution: Hawaii, Maui, Molokai, and Oahu.

Specimens examined: *L. W. Bryan*, alt. 2,500 feet, land of Manuka, Kau District, Hawaii, February, 1933 (Deg.; Field; a form with branchlets more angular); *Otto Degener* 9,841, in forest, Kohala Forest Reserve, Hawaii, August 8, 1926 (Deg.; Field; fruiting); *Degener* 10,300, in forest, "2nd valley," Molokai, June 19, 1928 (Deg.; Field; staminate, subflowering material, somewhat atypic); *Degener, Salucop, & Arlantico* 12,019, erect tree 15 feet tall with horizontal branches, in forest, Pupukea-Kahuku area, Oahu, April 24, 1938 (Berl.; Deg.; Field, 2 sheets; fruiting); *Degener, Shigeura, & Topping* 10,065, in woods, Manoa Cliff Trail, Oahu, November 20, 1935 (Berl.; Deg.; Field; fruiting); *Abbé Urbain Faurie* 537, Waianae, Oahu, May, 1909 (Par.; fruiting); *Charles N. Forbes* 1,602–*O*, east side of Nuuanu Valley, Oahu, October, 1910 (Field; Mo.; fruiting); *Forbes* 1,844–*O*, Waiolani Ridge, Oahu, October 27, 1913 (Bish.; fruiting); *Forbes* (with *Mr. Labouchere*) 2,293–*O*, Kalihi Pali, Oahu, February 16, 1916 (Bish.; post-fruiting); *Forbes* 2,327–*M*, central ridge of Olowalu Valley, West Maui, May 12, 1920 (Bish.; staminate); *Francis R. Fosberg* 13,002 *pro parte*, shrub 2–3 meters tall, alt. 860 meters, on moist wooded ridge, east ridge of Puu Kalena,

[1] A small additional specimen, *Remy* 361*bis*, is in Gray Herbarium and this was labeled "*Labordia tinifolia*, n. sp." by Gray himself. This specimen is now seen, however, to be varietally different and referable to var *Euphorbioidea*.

Waianae Mts., Waianaeuka, Oahu, March 22, 1936 (Field; fruiting); *F. R. & V. O. Fosberg* 13,737, tree 2 meters tall, flowers greenish, in wet forest, alt. 650 meters, Castle Trail, Punaluu Valley, Koolau Mts., Oahu, April 25, 1937 (Bish.; Field; pistillate); *Fosberg & Fosberg* 14,195, bush 2 meters tall, in moist forest, alt. 430 meters, Mt. Tantalus, Koolau Mts., July 5, 1937 (Bish.; Field; fruiting); *Fosberg & E. Y. Hosaka* 14,001, tree 6 meters tall, alt. 460 meters, in moist forest, Pupukea-Kahuku Trail, Hanakaoe, crest of Koolau Mts., May 31, 1937 (Field; fruiting); *William Hillebrand*, Makawao beyond Pumelei, East Maui, July, 1858 (Berl.; staminate); *Hillebrand*, valley on Oahu, September, 1860 (Berl.; fruiting); *Hillebrand*, Gulch of Olualu (Olowalu), West Maui, August, 1870 (Berl.; fruiting); *Hillebrand* 404, Nuuanu, Oahu, communic. in 1865 (Gray; Kew; pistillate, both flowering and fruiting); *Hillebrand & Rev. J. M. Lydgate*, Pauoa, Oahu (Bish.; pistillate, both flowering and fruiting); *Hillebrand & Lydgate* 95, Halona, West Maui (Bish.; pistillate, some corolla tubes only 3.5 mm. long and basally much thickened); *Horace Mann & William T. Brigham* 610 *pro parte*, Oahu (Gray; fruiting); *Mann & Brigham* 738 (renumbered 610), without locality (Bish.; fruiting); *Jules Remy* 320, Oahu, 1851–1855 (Par.; pistillate); *Remy* 360, Maui (as to staminate, flowering specimens) and Hawaii (as to fruiting specimens), 1851–1855 (Gray, flowering and fruiting; Par., fruiting); *Remy* 361, mountains, Oahu, April, 1855 (Gray; Par.; subflowering); *Joseph F. Rock*, Haleakala, East Maui (Mus. V.; pistillate); *Rock*, Kailua ditch trail, Waikamoi, East Maui, May, 1911 (Gray; pistillate); *Rock*, Honomanu Trail, EastMaui, May, 1911 (Bish.; Field; staminate); *Rock* 14,062, without locality or date (Bish.; Field; staminate); *United States Exploring Expedition under Captain Wilkes*, Hawaiian Isls., 1840 (N. Y., pistillate; U. S., fruiting).

The Rock material from East Maui has especially short, urceolate corollas and was considered a new species by its collector. Its corollas are matched in size and shape fairly well by some on the Hillebrand & Lydgate specimen from Halona, West Maui. In the absence of fruiting characters, however, there seems no reason for regarding either collection as representing more than merely a somewhat smaller-flowered extreme of *L. Tinifolia*.

Labordia Tinifolia var. **β parvifolia** Sherff, Amer. Journ. Bot. 25: 583. 1938; *Labordia Tinifolia* var. β Hillebr. Fl. Haw. Isls. 293. 1888.

Leaves smaller, petioles 4–10 mm. long; blades commonly oblong-elliptic, at both ends acuminate, 2.5–4 cm. long and 1–1.6 cm. wide,

principal lateral nerves 3–5 to each side. Cymes few-flowered, peduncle slender and ±2 cm. long, pedicels capilliform and 2–2.5 cm. long; capsules blackish or gray, 6–8 mm. tall.

Type specimen: Collected by *William Hillebrand*, Kalaupapa Pali, central northern coast of Molokai (Berl.).

Distribution: Known only from type locality on Molokai.

Specimens examined: *Hillebrand*, Kalaupapa (type, Berl.; fruiting).

Numerous specimens referred in herbaria to Hillebrand's var. β by various workers on the Hawaiian flora are found to differ sharply from Hillebrand's type, mostly in shape and size of leaves, and in shape, size, and abundance of capsules. The type consists of three small fruiting specimens; flowers are entirely lacking.

Labordia Tinifolia var. γ **leptantha** Sherff, Amer. Journ. Bot. 25: 582. 1938.

Small tree or shrub similar in habit to species proper; branchlets slender, terete, gray. Leaves very glabrous, petiolate with petioles slender and 0.5–1.5 cm. long; blades elliptic-oblong or scarcely elliptic-obovate, at apex acute or acuminate, at base acute or cuneate or rarely subrotund, at margin entire or obscurely subdenticulate, membranaceous, 4–8.5 cm. long and 1.7–3.2 cm. wide, principal lateral nerves 5–8 to each side. Interpetiolar stipular body ovate-triangulate, pubescent above, 1–1.5 mm. tall. Inflorescence cymose-paniculate, subsessile (for staminate specimens) or manifestly pedunculate (for pistillate specimens); the ultimate pedicels glabrate, at first very slender, 7–15 mm. long. Bractlets subulate, 1–2 mm. long. Calyx about 2 mm. tall; lobes connate below middle, triangulate-subulate, glabrous or at margin very minutely hispidulous-ciliate; corolla narrowly cylindric, externally glabrate, internally erect-setose, tube 8–9 mm. long and less than 2 mm. thick, lobes triangulate-lanceolate, spreading or at apex reflexed, about 3 mm. long; anthers very slightly exserted; pistillode pubescent at top, clavate-dilated, finally exserted for about 1 mm. Capsule globose or sub-obovate-globose, finally black, 4–6 mm. long; valves 2, dorsally rounded, at apex minutely mucronate.

Type specimen: Collected by *Joseph F. Rock*, no. 14,062, Kalae, Molokai, May 25, 1918 (Bish., 2 sheets).

Distribution: Southeastern Oahu, West Maui, and north-central Molokai.

Specimens examined: *Anonymous* (*Otto Degener* distrib. no.) 10,241, trail at Nuuanu Pali "hairpin turn," Oahu, November 20,

1926 (Deg.; Field; fruiting); *Degener* 10,255, exposed slope, northeast of Nuuanu Pali, Oahu, November 20, 1926 (Berl.; Deg.; Field; fruiting); *Degener* 10,260, in forest, half mile north of Keahikauo, West Maui, July 21, 1927 (Berl.; Deg.; Field; fruiting); *Charles N. Forbes* 1,602–*O*, east side of Nuuanu Valley, Oahu, October, 1910 (Berl.; Bish.; Field; Gray; Kew; fruiting); *Forbes* 2,306–*M*, ridge, left-hand side, Olowalu Valley, southwestern West Maui, May 10, 1920 (Berl.; Bish.; Field; staminate); *William Hillebrand*, Wailupe, Oahu (Berl.; U. S.; fruiting); *Hillebrand*, same locality, 1870 (Berl.; staminate); *Rock* 14,062 (type, Bish., 2 sheets; staminate, abundantly flowering); *communic. Heinrich Wawra sub num.* 2,283 (*legit William Hillebrand*), Oahu (Mus. V.; fruiting).

The fruiting characters are drawn from Oahu material (*Degener* distrib. no. 10,241; *Forbes* 1,602–*O;* Hillebrand, Mus. V.). All pistillate or fruiting specimens examined differed from the staminate in having definitely pedunculate inflorescence. Further studies should be made in the field to confirm the varietal identity of the two sets of specimens listed here. (It might even be that some botanists will prefer a separate specific status for var. *leptantha.* The description therefore has been presented as fully as herbarium material available would seem to warrant.)

Labordia Tinifolia var. *δ* **waialuana** Sherff, Amer. Journ. Bot. 25: 583. 1938.

Petioles 1–1.8 cm. long; blades subrhomboidally elliptic-oblong, at base cuneate or subacuminate, at apex subobtuse and very shortly or obsoletely mucronate, 6–8.5 cm. long and 1.7–3.2 cm. wide, principal lateral nerves 5–7 to each side. Inflorescence at least 3- or 9-flowered, slenderly pedunculate with a peduncle 2–3 cm. long. Staminate flowers (pistillate not seen) pedicellate, pedicels up to 1.5 cm. long; corolla 2.5 mm. thick toward base, tube urceolate-cylindric and 7–8 mm. long, lobes ±3 mm. long; anthers not or but slightly exserted.

Type specimen: Collected by *Horace Mann* and *William T. Brigham*, no. 562, Waialua Mountains, Oahu (Gray).

Distribution: Northwestern Oahu.

Specimens examined: *Mann & Brigham* 562 (type, Gray: cotypes, Corn.; Field; N. Y.; both staminate and fruiting).

The type number is represented in the New York Botanical Garden by additional but very fragmentary specimens of fruiting material, on the same sheet with staminate, flowering material. The

capsules are as in the var. *leptantha*. The sheet at Cornell University has two sprays, each with two triflorous inflorescences. Mann had designated these specimens at Cornell as a variety of *L. Tinifolia* and chosen a varietal name alluding to the triflorous habit. In his printed Enumeration published later on (Proc. Amer. Acad. 7: 197. 1867), however, he listed the collection as *L. Tinifolia*.

Labordia Tinifolia var. ε **lanaiensis** Sherff, Amer. Journ. Bot. 25: 583. 1938; *Labordia Tinifolia* var. γ Hillebr. Fl. Haw. Isls. 293. 1888 (excluding the Kauai or first cited material).

Petioles 4–14 mm. long; blades oblong or widely oblong-oval or more rarely subobovate, at apex obtuse or subacute or even subacuminate, at base widely cuneate or rarely almost subrotund, commonly 4–8 (sometimes up to 9.5) cm. long and 2–4 (sometimes up to 5.2) cm. wide. Inflorescence very slenderly pedunculate with a peduncle up to 3.5 cm. long, few- (±9–12-) flowered, pedicels delicate. Corolla (only staminate flowers known) not or but slightly dilated below, about 7 mm. long, lobes ±2 mm. long; pistillode slightly exserted. Capsules narrowly or oblongly ovoid in outline, at apex sharply mucronate, 1.3–1.7 cm. long.

Type specimen: Collected by *William Hillebrand*, Lanai, July, 1870 (Berl.).

Distribution: Hawaii, eastern Lanai, and western Maui.

Specimens examined: *Charles N. Forbes*, Lanai, March 9, 1916 (Field); *Forbes* 4–*L*, Kaiholena Valley, Lanai, June, 1913 (Field; fruiting); *Forbes* 79–*L*, mountains near Koele, Lanai, June 9, 1909 (Bish.; Field; Kew; Mo.; subfruiting); *Forbes* 267–*L*, mountains at east end of Lanai, June, 1913 (Bish.; Field; Gray; subfruiting); *Forbes* 281–*L*, same locality and date (Berl.; Bish.; Field; Kew; Mo.; subflowering and fruiting); *William Hillebrand*, Kaanapali, West Maui (Berl.; subflowering and fruiting; labeled by Hillebrand for his var. γ); *Hillebrand*, Hawaii, 1868 (Berl.; fruiting); *Hillebrand*, Lanai, July, 1870 (type, Berl.; staminate); *George C. Munro* 35, "Waiopaa," Lanai, March 27, 1915 (Bish.; staminate); *Munro* (similarly) 35, Kaohai, Lanai, July 2, 1914 (Bish.; fruiting); *Munro* 430, pali above "Waiopaa," Lanai, March 27, 1915 (Bish.; Field; staminate); *Munro* 432, head of Maunalei by Mahana, Lanai, March 27, 1915 (Bish.; Field; subfruiting); *Joseph F. Rock* 8,000, alt. 2,000 feet, dry forehills, Mahana Valley, Lanai, August 1, 1910 (Bish., 2 sheets; Field; Gray; Kew; Mus. V.; fruiting); *Rock* 8,099, damp forest, Mahana Valley, August 6, 1910 (Bish.; Gray; Mus. V.; fruiting); *Rock* 8,169, West Maui, August, 1910 (Bish.; fruiting).

The type has small leaves, the blade commonly 3–5 cm. long and up to 2.4 cm. wide. The larger measurements in the description, as also the characters of the capsule, are taken from other cited specimens, which do not appear to be varietally different.

Labordia Tinifolia var. ζ **Euphorbioidea** Sherff, Amer. Journ. Bot. 25: 583. 1938.

Leaves smaller and more numerous, petioles commonly 4–7 mm. long; blades more or less obovate, 2–4 more rarely up to 5.3 cm. long and 1.2–1.7 more rarely up to 2.5 cm. wide, at apex more often obtuse or rotund. Inflorescence few- or subnumerously flowered; peduncle ±5–10 mm. long, standing between 2 branches. Capsule as in species proper.

Type specimen: Collected by *Joseph F. Rock*, no. 8,616, alt. 2,500 feet, in lower forest, Makawao, East Maui, October, 1910 (Bish.).

Distribution: East Maui.

Specimens examined: *H. M. Curran* 66, Maui, April, 1911 (U. S.; sterile); *Abbé Urbain Faurie* 536, Haleakala, August, 1909 (Bish.; fruiting); *Jules Remy* 361*bis*, Maui, 1851–1855 (Gray; subfruiting); *Rock* 8,616 (type, Bish.: cotypes, Gray; Mus. V.; fruiting).

The small, mostly obovate, often crowded leaves give specimens of this variety a striking resemblance to those of several varieties of *Euphorbia Celastroides* and of *E. multiformis*. Rock (Indig. Trees Haw. Isls. 406. 1913) describes the trunks of the trees in the forests above Makawao as straight.

Labordia Tinifolia var. η **Forbesii** Sherff, Amer. Journ. Bot. 25: 583. 1938.

Leaves abundant, pallid, the delicate petiole usually 1–2 cm. long; blade variously lanceolate subrhombic-lanceolate or elliptic-oblanceolate but seldom broader, at apex more attenuately acuminate than in species proper, 5–8 cm. long and 1–3 cm. wide. Pistil minute, about 4 mm. long, style more or less twisted near stigma. Capsule globose-obovate, 5–8.5 mm. long.

Type specimen: Collected by *Charles N. Forbes*, no. 553–*Mo*, on slopes of Olokui, Wailau, Molokai, September, 1912 (Bish.).

Distribution: Known only from type locality in northeastern Molokai.

Specimens examined: *Forbes* 553–*Mo* (type, Bish.: cotypes, Berl.; Bish.; Field; Gray; Kew; Mo.; pistillate and post-fruiting).

Labordia Tinifolia var. *θ* **microgyna** Deg. & Sherff, var. nov.

Folia oblonge vel elliptice lanceolata, petiolo angusto ±1 cm. longo, lamina saepius 5–7.5 cm. longa et 2–3 cm. lata. Inflorescentia paniculata, ±17-flora. Calyx circ. 2 mm. altus. Corolla ±8 mm. alta, tubo ±2 mm. crasso. Pistillum ad anthesin tantum circ. 4 mm. longum, rectum; ovario ovoideo et vix 1.5 mm. longo; stylo sursum in stigma breve et parce dilatatum sensim attenuato. Capsula et planta masculina ignotae.

Leaves oblong- or elliptic-lanceolate; petiole slender, ±1 cm. long; blade more often 5–7.5 cm. long and 2–3 cm. wide. Inflorescence paniculate, ±17-flowered. Calyx about 2 mm. tall. Corolla ±8 mm. tall, tube ±2 mm. thick. Pistil at anthesis only about 4 mm. long, straight; ovary ovoid and scarcely 1.5 mm. long; style gradually narrowed above into a short and scarcely dilated stigma. Capsule and staminate plant unknown.

Type specimen: Collected by *Otto Degener*, no. 10,251, in rainforest, northeast of Kipu, Kauai, June 17, 1926 (Field).

Distribution: Southeasternmost Kauai.

Specimens examined: *Degener* 10,251 (type, Field; cotypes, Berl.; Deg.; pistillate).

The foliar habit seems entirely that of *L. Tinifolia* proper, but the diminutive, straight pistils with their thickish and not distinctly differentiated style and their short, inconspicuous stigma are somewhat anomalous. Staminate flowers and mature capsules are much to be desired. If *L. microgyna* is to be retained as a variety of *L. Tinifolia*, it is probably best placed next to var. *Forbesii*. In the latter variety, the pistil is likewise minute, but is distinctly differentiated into ovary, style, and stigma.

Labordia Tinifolia var. *ι* **tenuifolia** Degener & Sherff *ex* Sherff, Amer. Journ. Bot. 25: 583. 1938.

Erect, slender tree. Leaves pallid, the slender petiole 0.5–1.5 cm. long; blade lanceolate or elliptic-oblanceolate or oblong-subovate, at apex scarcely or moderately acuminate, commonly 4–6.5 (more rarely –9) cm. long and 1.5–2.2 (more rarely –3.3) cm. wide. Flowers numerous (more often 15–30), subcorymbosely disposed in a pendulous inflorescence. Corolla yellow and not truly orange; tube slender, about 7 mm. long and toward base 1.3–1.7 mm. thick; lobes 3–3.5 mm. long; pistillode with a black and glabrate style.

Type specimen: Collected by *Otto Degener*, no. 10,272, erect,

slender tree 12 feet tall, in forest, Kahuaawi Gulch, Molokai, May 12, 1928 (Field, 2 sheets).

Distribution: Known only from type locality in central Molokai.

Specimens examined: *Otto Degener*, Molokai, May 25, 1928 (Berl.; Deg.; Field; Gray; Kew; Mo.; Mus. V.; Par.; U. S.; staminate); *Degener* 10,272 (type, Field, 2 sheets: cotypes, Berl.; Brit.; Del.; Gray; Kew; Mo.; Mus. V.; Par.; U. S.; staminate but mostly subflowering); *Degener* 10,300, Molokai, June 19, 1928 (Field, 2 sheets; subflowering).

Labordia Tinifolia var. κ **honolulensis** Sherff, Amer. Journ. Bot. 25: 584. 1938.

Principal leaves with blades more often 4–5.5 cm. long, the others often numerous and small with blades only 2–4 cm. long, all narrowly or moderately oblanceolate and at apex more often acuminate. Flowers unknown. Capsule black, valves 5–7 mm. tall including rostrum.

Type specimen: Collected by *Charles N. Forbes* (with *Mrs. G. E. Kelly*), no. 2,388-*O*, on Pacific Heights ridge, Oahu, August 1, 1916 (Bish.).

Distribution: Known only from type locality, northeastern part of Honolulu, Oahu.

Specimens examined: *Otto Degener* 10,254, Pauoa Flats, November 22, 1925 (Deg.; fruiting); *Forbes* 2,388–*O* (type, Bish.: cotypes, Berl.; Field; fruiting).

22. **Labordia kaalae** Forbes, Occas. Paps. 6: 174 and *pl.* 1916.

a. Branchlets (including those of inflorescence) glabrous or glabrate or at most papillate.

b. Leaf-petioles usually 3–7 mm. long.

c. Principal leaves more or less subtruncate at base; plant native of Oahu.....var. γ *brachypoda*.

c. Principal leaves rounded-cuneate at base; plant native of Kauai.....var. ε *kauaiensis*.

b. Leaf-petioles 0.8–2.5 cm. long.

c. Leaf-blades 6–8 cm. long and 3.5–4.3 cm. wide; petioles thickish, ±1.5 cm. long; capsules obovoid..var. δ *mendax*.

c. Leaf-blades 8–10 cm. long and 4–5 cm. wide; petioles slender, up to 2.2 cm. long; capsules (submature) ovoid.
var. β *Fosbergii*.

a. Branchlets (including those of inflorescence) and lower leaf-surfaces tomentulose or hispidulous.....*L. kaalae sensu stricto.*

A slender tree with dark bark, ±6 meters tall, branches divaricate; branchlets tomentulose or hispidulous, terete, grayish to purplish-black. Leaves petiolate; petioles slender, 0.8–2.5 cm. long, tomentulose; blades broadly elliptic-oblong to obovate-oblong, terminally broad or almost subrotund, at apex itself abruptly subacute, at base evenly or obliquely subtruncate and emarginate or subcordate, glabrous above, finely tomentulo-hispidulous beneath, membranaceous, 8–13 cm. long and 4–7 cm. wide, with commonly 8–10 principal lateral nerves to each side. Flowers greenish, numerous (9–25), in a pedunculate, paniculate, pubescent cyme; peduncle slender, 1–3.5 cm. long; bractlets subulate, 1–2 mm. long; calyx divided to middle or almost to base, pubescent, 3–4 mm. long, the erect or spreading lobes lanceolate-subulate or below middle more often ovate-dilated and frequently hyaline-margined down to their rounded or subauriculate base; corolla glabrous, green, its cylindric tube about 9–10 mm. long and in lower part about 4 mm. thick, the lobes triangular and about 2–3 mm. long; anthers partly exserted from corolla-tube; pistillode whitish-setulose on its ovary, 8–11 mm. long, the stylar portion capillary; capsule (submature) ovoid-globose, apically short-rostrate, 1.5 cm. tall (including the short rostrum, this under 1 mm. long), 2-valved, glabrous or glabrate, pale green.

Type specimen: Collected by *Charles N. Forbes*, no. 1,790–*O*, ridges of Puu Kaala at the head of Mokuleia Valley, Oahu, April 29, 1912 (Bish.).

Distribution: Known only from northwestern Oahu.

Specimens examined: *Otto Degener, Emilio Ordoñez, & J. Foster* 12,358, in dark forest, southeast slope of Puu Hapapa, June 4, 1939 (Berl.; Deg.; Field; fruiting); *Forbes* 1,790–*O* (cotypes, Bish.; Mo.; staminate); *Francis R. Fosberg* 13,059 tree 6 meters tall, flowers green, in moist forest, alt. 550 meters, Pahole (Kukuiula) Gulch, near head of right branch, Waianae Mts., Mokuleia, April 12, 1936 (Bish.; Field; flowering and fruiting).

The capsules were unknown to Forbes but have since been collected in a submature state by Fosberg, from whose plants the fruiting characters have been described.

Labordia kaalae var. *β* **Fosbergii** Sherff, Amer. Journ. Bot. 25: 588. 1938.

Shrub 2–3 meters tall, branchlets and leaves pale green and very glabrous. Petioles 1–2.2 cm. long, blades 8–10 cm. long and 4–5 cm. wide. Inflorescence paniculate and lax, up to 12 cm. wide, ±22-flowered; peduncle slender, 4–6 cm. long. Capsule (submature) ovoid, about 1 cm. tall.

Type specimen: Collected by *Francis R. Fosberg*, no. 13,002 *pro parte*, shrub 2–3 meters tall, fruits greenish, on moist, wooded ridge, alt. 860 meters, east ridge of Puu Kalena, Waianae Mts., Waianaeuka, Oahu, March 22, 1936 (type, Bish.).

Distribution: Known only from type locality in northwestern Oahu.

Specimens examined: *Fosberg* 13,002 *pro parte* (type, Bish.; fruiting).

The variety was named in honor of Mr. Fosberg, who had already done much in the botanical exploration of the Hawaiian Islands and who had most generously placed his large collection of *Labordia* material in my hands for study.

Labordia kaalae var. γ **brachypoda** Sherff, Amer. Journ. Bot. 25: 588. 1938.

Petioles 3–7 mm. long; blades 5–8 cm. long and 2–4.8 cm. wide, glabrous on both surfaces, principal lateral nerves about 7 to a single side. Inflorescence 3–5-flowered. Sepals glabrous, 1–2 mm. long, not diaphanous at margins. Capsules (submature) conic-ovoid, at apex subrostrate, black when dry, glabrous or glabrate, about 1.2 cm. long.

Type specimen: Collected by *Charles N. Forbes*, no. 1,587–*O*, Popouwela, Waianae Mts., Oahu, April 27, 1910 (Bish., 2 sheets).

Distribution: Known only from type locality in northwestern Oahu.

Specimens examined: *Forbes* 1,587–*O* (type, Bish., 2 sheets: cotype, Mo.; fruiting).

The type and cotype had been variously suspected by Forbes of being his *L. kaalae*, of representing a variety of *L. triflora* Hillebr., or of being typical *L. triflora* Hillebr. and (in Forbes' judgment) perhaps meriting, as such, a varietal status under *L. Tinifolia* A. Gray. The frequently cordate leaf-bases, the simpler inflorescence with its 3–5 instead of 10–15 or more flowers, the larger and more conic-pointed capsules, etc. all separate var. *brachypoda* from *L. Tinifolia*. The frequently contracted bases and the broader and

more or less obtuse (not acuminate) apices of the more rigid leaf-blades, the longer petioles (commonly 3–7 mm. long, not 1–2 mm. long or almost lacking), the much shorter (1–2.7 cm. not 3–5 cm. long) and thicker peduncles, etc. distinguish var. *brachypoda* easily from *L. triflora*. The shorter leaf-petioles (3–7 mm. not 0.8–2.1 cm. long), smaller leaf-blades (5–8 cm. not commonly 8–13 cm. long, 2–4.8 cm. not 4–7 cm. wide) with their glabrous, not finely tomentose, lower surfaces and their usually 7 not commonly 8 to 10 principal lateral nerves to each side, the few flowers (3–5 not 9–25 in a cyme), their conic-ovoid apically narrowed and rostrate 10–12 (or more) mm. long (not obovate-globose apically short-mucronate 8–9 mm. long) capsules, and doubtless other characters will separate var. *brachypoda* from *L. kaalae* proper.

Labordia kaalae var. δ **mendax** Sherff, Amer. Journ. Bot. 25: 589. 1938.

Glabrate or glabrous; blades 6–8 cm. long and 3.5–4.3 cm. wide, petioles rather thickish and about 1.5 cm. long. Sepals dorsally glabrous, the edges diaphanous below. Capsules obovoid, 8–9 (even –10) mm. tall.

Type specimen: Collected by *Alfred Meebold*, alt. 3,800 feet, Makaleha ridge, Kaala, Waianae Mts., Oahu, June, 1932 (Bish.).

Distribution: Known only from type locality in northwestern Oahu.

Specimens examined: *Meebold*, alt. 3,800 feet, etc. (type, Bish.; fruiting).

In its leaves and fruits this variety somewhat suggests *Labordia Tinifolia* A. Gray.

Labordia kaalae var. ε **kauaiensis** var. nov.

Glabra. Foliorum petioli 5–7 (rarius –10) cm. longi; laminis oblongo-ovalibus, apice subacutis vel subacuminatis, basi rotundo-cuneatis, coriaceis. Calyx extus glaber, circ. 2 mm. altus; sepalis triangulato-ovatis vel supra subulatis infra moderate dilatatis, margine non vel vix diaphanis sed minutissime ciliatis.

Glabrous. Leaf-petioles 5–7 (more rarely –10) cm. long; -blades oblong-oval, at apex subacute or subacuminate, at base rounded-cuneate, coriaceous. Calyx externally glabrous, about 2 mm. tall; sepals triangulate-ovate or above subulate and below moderately dilated, at margin not or scarcely diaphanous but very minutely ciliate.

Type specimen: Collected by *Charles N. Forbes, sine num.*, Kauai (Bish.).

Distribution: Kauai, exact locality unknown.

Specimens examined: *Forbes*, Kauai (type, Bish.; subflowering).

23. **Labordia decurrens** Sherff, Amer. Journ. Bot. 25: 581. 1938.

Shrub or small tree; branchlets very delicate, grayish-brown, subterete, glabrous or moderately papillate; stipules subobsolete, only about 1 mm. tall. Leaves large; petiole flat or toward base conduplicate, 1–2.5 cm. long; blade broadly subspatulate-lanceolate, 1–1.8 dm. long and 2–5 cm. wide, gradually narrowed below the middle to the more or less decurrent base, at apex acute or subacuminate, very membranaceous, glabrous, the median vein flat and about 1.5 mm. wide. Inflorescence paniculate-cymose, glabrous, ±6 cm. tall and ±7 cm. wide, finally up to about 15-fruited, its primary branches opposite and divaricate, the ultimate pedicels very delicate and commonly 1–1.5 cm. long. Flowers at anthesis not seen. Sepals finally spreading or subreflexed, lanceolate-triangulate, glabrous or at margins setulose, at apex more or less acute, about 1.5 mm. long. Capsules globose-obovoid, numerous and 6–7 mm. tall or few and ±9 mm. tall, black when dry, 2-valved, at apex very minutely rostrate, externally scrobiculate-rugulose but otherwise glabrous, valves not carinate.

Type specimen: Collected by *Horace Mann* and *William T. Brigham*, no. 610 *pro parte*, Oahu, May 4, 1864–May 18, 1865 (Mo.).

Distribution: Oahu.

Specimens examined: *Mann & Brigham* 610 *pro parte* (type, Mo.: cotypes, Corn.; Field; fruiting).

This species was confused by Mann with *Labordia Tinifolia* A. Gray. Indeed, Mann not only labeled the specimens of the type collection *L. Tinifolia* but applied his collection number 610 also to two other specimens (Bish.; Gray), both of which are true *L. Tinifolia*. *L. decurrens* differs enough, however, in the characters noted to be distinguished very easily from that species. The type collection lacks flowers, but the fruiting calyces are similar to those of *L. Tinifolia*.

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Labordia(?) Fauriei Lévl. *in* Fedde Repert. 10: 157. 1911. =*Calpidea Brunoniana* Endl. *fide* Rock *in* Fedde *op. cit.* 13: 352 *et* 353. 1914.

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ADDITIONAL STUDIES OF THE HAWAIIAN EUPHORBIACEAE

EARL EDWARD SHERFF

In a former paper (Revision of the Hawaiian species of *Euphorbia* L., Annals Missouri Bot. Gard. 25: 1–94, *pls. 2–11*. 1938), I have presented a monographic treatment of the species of *Euphorbia* L. indigenous or adventive in the Hawaiian Islands. In the present paper are set forth a revision of the Hawaiian species of *Claoxylon* and various additional results growing out of my recent studies of Hawaiian material in the genera *Aleurites, Drypetes, Phyllanthus, Antidesma,* and *Euphorbia*. During the progress of my work, many herbarium specimens have been made available to me, chiefly by the same institutions and individuals cited in the preface to the foregoing paper on *Labordia*. To all of these institutions and individuals I take this opportunity of expressing again my indebtedness and gratitude.

THE HAWAIIAN SPECIES OF THE GENUS CLAOXYLON A. Jussieu

The genus *Claoxylon* A. Juss. (Tent. Euphorb. 43, *tab. 14, fig. 43*. 1824) was divided into five sections by Johannes Mueller of Argovie (or Aargau; DC. Prodr. 15^{II}: 775–790. 1866). In the fourth of these, *Gymnoclaoxylon* Muell. Arg. (Linnaea 34: 165. 1865), he included the one Hawaiian species known to him, namely, *Claoxylon sandwicense* Muell. Arg. This he separated from the lone other species in that section, *C. fallax* Muell. Arg. of the Fiji Islands, by the fact that it had about 200 stamens in a single staminate flower, while *C. fallax* had about 30. Mueller's treatment of *Claoxylon* is repeated, in abridged form, by Engler and Prantl (Natürl. Pflanzenfam. 3^{V}: 48. 1896). For the synonymy of the genus the reader may consult Mueller Arg., also Bentham and Hooker (Gen. Pl. 3: 309. 1880). It may be noted here, however, that in recent years numerous additional species within the genus have been proposed. Thus the number of known species has been increased from the forty-two described by Mueller Arg. to ninety or more at the present time (cf.

F. Brown, Bernice P. Bishop Mus. Bull. 130: 148. 1935: "Approximately 90 species centering in Africa; well represented in Malaysia; relatively few species in Asia, the islands of the Indian Ocean, Australia, or Polynesia; absent from America"). The three Hawaiian species included in the present revisional treatment all belong to the section *Gymnoclaoxylon* Muell. Arg., described by its author as having: staminate receptacle entirely eglandular, accompanied neither by an extrastamineal disc nor by juxtastamineal glands; anthers extrorsely 2-fissured.

Genus CLAOXYLON A. Juss.: Description

A. Jussieu, Tent. Euphorb. 43, *tab. 14, fig. 43*. 1824.

Trees or shrubs or more rarely herbs, glabrous or appressedly short-pubescent. Leaves alternate, simple, stipulate, penninerved, often purplish or subviolet-reddish, subtended by 2–4 more or less distinctly denticuliform and at times caducous stipules, never maculate-glandular beneath, commonly large, membranaceous or scarcely coriaceous, in our species, at least, smooth in live state but when dry minutely scabrid especially on lower surface. Spikes or racemes axillary or lateral, solitary or subfasciculate, shorter than the leaves. Flowers dioecious or more rarely but in our species probably always monoecious, apetalous. *Staminate flowers:* Calyx of 3 or 4 segments, subglobose and valvate in the bud, usually more or less closed. Stamens usually numerous, centrally affixed to the receptacle and variously associated with its glands (these, when present, now covering the entire receptacle and being dispersed among the bases of the filaments, now surrounding the receptacle and being coalesced with it, or at times being arranged according to both plans in the same flower); anther-cells distinct except at their base, erect, obovoid or subglobose, lengthwise (now introrsely now extrorsely) dehiscent from their apex; filaments free, short. Rudiment of ovary lacking. *Pistillate flowers:* Calyx less deeply divided, its 2–4 lobes always or at least often valvate and alternating with glands. Receptacle marginally entire or lobed. Ovary 3- or more rarely 2-celled, a single ovule in each cell. Styles as many as the ovary-cells, simple, short, free or at base connate, spreading, on inner surface plumose or coarsely papillate-stigmatose or more rarely smoothish. Capsule dividing into 2-valved cocci. Seeds estrophiolate, subglobose, often (their epidermis having become loosened) purplish-red, involute; testa now foveolate-depressed, now scrobiculate-roughened; albumen (perisperm) fleshy; cotyledons broad, flat.

ABBREVIATIONS USED FOR HERBARIA CITED

(See p. 464)

KEY

a. Leaves ±3 dm. long and ±1.1 dm. wide; capsules about 2.5 cm. wide and 1.2–1.6 cm. tall; plant from Hawaii.....3. *C. Remyi.*

a. Leaves and capsules much smaller.

b. Leaves, when full grown, densely short-tomentulose with arcuate, yellowish-brown setulae.....1. *C. Helleri.*

b. Leaves, when full grown, glabrate or at most moderately or on veins densely appressed-hispid.

2. *C. sandwicense* and vars.

1. **Claoxylon Helleri** Sherff, Amer. Journ. Bot. 24: 88. 1937.

Claoxylon tomentosum Heller, Minn. Bot. Studs. 1: 843. 1897 (*exclud. syn.* Hellebr.).

Small tree, in habit probably similar to *C. sandwicense;* branchlets yellowish-green when dry, their leaf scars marginally more or less hispid. Leaves yellow-green when dry, petiolate; petiole slender, shortly and softly tomentulose, 2–5 cm. long; blade elliptic-oblong or -ovate, apically obtuse or truncate-emarginate, basally rounded or at first broadly cuneate, at margin sharply and numerously denticulate with calloused and more or less hispidulous teeth, 9–14 cm. long and 5.5–9 cm. wide, rigidly membranaceous, scabrid above, softly and densely tomentose beneath. Stipules not seen. Flowers without doubt monoecious, in axillary depauperate few-noded racemes (nodes with alternate areolate minutely hispid-bracteate commonly 1- or 2-flowered glomerules; rachis subappressedly antrorse-hispid, about 1–1.3 mm. thick); staminate flowers pedicellate (pedicel appressedly antrorse-hispidulous and up to 1.5 cm. long), deeply 3-parted (sepals ovate, at apex acute or subacute, on outer surface densely and antrorsely yellow-hispid, on inner scabrid-glabrate and obscurely 1–7-nerved, 5–6 mm. long, at anthesis spreading), stamens violaceous, ±200; pistillate flowers (a single one observed, this with fruit) deeply 3-parted (sepals smaller than the similar sepals of the staminate flowers—in fact only 3–3.5 mm. long), the minute oblong-linear purplish-black glands only about 1–1.5 mm. long, the dark purple subsparsely and appressedly antrorse-hispid capsule 3-celled (cocci outwardly rounded), about 5 mm. tall and ±5 mm. thick (a single mature seed observed; this ovoid-globose, reddish-gray, wrinkled, scarcely 3.5 mm. long).

Type specimen: Collected by *Amos Arthur Heller*, no. 2,878, on the edge of the plateau above Waimea, Kauai, October 15, 1895 (Field).

Distribution: Southwestern Kauai.

Specimens examined: *Heller* 2,878 (type, Field: cotypes, Berl.; Bish.; Gray; Kew; Par.).

For remarks about this species, see under *C. sandwicense* var. *tomentosum* (p. 555).

2. **Claoxylon sandwicense** Muell. Arg. Linnaea 34: 165. 1865; *in* DC. Prodr. 15[II]: 780. 1866.

a. Leaves ventrally somewhat pilose especially along veins or finally glabrate.

b. Leaf-blades 7–10 rarely –13 cm. long and 2–3 rarely a few –5.5 cm. wide, finally glabrate even around teeth; plant of East Maui.....*C. sandwicense sensu stricto.*

b. Leaf-blades larger or proportionately broader.

c. Leaf-blades broadly oblong or even subrotund, larger ones 6–9 cm. long and 5–7.5 cm. wide.....var. ζ *Degeneri.*

c. Leaf-blades proportionately narrower.

d. Flowers singly disposed or in fascicles of 2–5.

e. Rachis and pedicels of inflorescence pubescent. var. β *magnifolium.*

e. Rachis and pedicels of inflorescence becoming glabrate or even glabrous.....var. ε *glabrescens.*

d. Flowers commonly 7–15 in a fascicle; native of northwestern Hawaii.....var. γ *Hillebrandii.*

a. Leaves ventrally tomentose or when full grown moderately appressed-hispid; native of western Kauai..var. δ *tomentosum.*

Small tree; branchlets densely foliose and brownish-hispid at apex, presently glabrate. Leaf-petiole usually under 2 cm. long, somewhat rigid, brownish-hispid; blade narrowly spatulate-obovate, shortly and obtusely acuminate, gradually narrowed to an acute or subacute base, rigidly membranaceous, glandular-denticulate along the more or less narrow-indurate edges, opaque, scabrid, yellowish-green at least when dry, finally glabrate (even around the teeth), 7–10 cm. long and 2–3 cm. wide (or larger on leaves of young plants or of sterile branches), the veins subobscure above but moderately visible beneath (commonly yellow-brown on drying, as also the petiole). Flowers monoecious. Racemes up to 5.5 cm. long, axis at

first brownish-hispid with antrorse and appressed hairs but presently glabrate, terminal flower perhaps pistillate but rest mostly staminate. *Staminate flowers:* Calyx about 4–6 mm. across before anthesis and up to 7.5 mm. tall, appressedly and antrorsely short-hispid on outer surface, glabrate within, mostly exceeded by pedicel; sepals deltoid-ovate, narrowed above, acute at apex. *Pistillate flowers:* Calyx similar but smaller, the sepals only 1.5–2.5 mm. long and subobtuse at apex; glands oblong-linear, purplish-black, equaling the sepals; capsule purple, glabrate, 4.5–5 mm. across and 3–4 mm. tall, deeply 3-parted, locules rounded.

Type specimen: Collected by *Charles Gaudichaud*, Hawaiian Islands, 1836 (Del.).

Distribution: Southwestern corner of East Maui.

Specimens examined: *Gaudichaud*, Hawaiian Isls. (Berl.; Par.); *Gaudichaud*, Hawaiian Isls., October, 1836 (Del., type or cotype specimen); *Gaudichaud* 392, September and October, 1836 (Field; Par., 2 sheets); *George C. Munro* 393, at or near Ulupalakua, February 12, 1913 (Bish.); *Charles N. Forbes* 1,971–*M*, Auwahi, south slope of Haleakala, March 15, 1920 (Berl.; Bish.; Del.; Field; Gray; Kew; N. Y.); *Joseph F. Rock* 8,675, alt. 3,000 feet, lava fields, Auahi (i.e., Auwahi; Bish.; Field).

Claoxylon sandwicense var. *β* **magnifolium** Sherff, Amer. Journ. Bot. 24: 88. 1937.

Fruticose or arborescent, 3–4.5 meters tall, wood soft; branches pale and spreading, their terminal portions at first appressed-hairy but presently glabrate. Leaf-petiole slender, subrigid, glabrate or more often sparsely and antrorse-appressedly brown-pilose, 2–5 cm. long; blade moderately to widely obovate-oblong, at apex obtuse or shortly acuminate, mostly cuneate-contracted toward base, marginally crenate-serrate or -denticulate (tips of teeth indurated, often inflexed, often surrounded by a circular row of stiff, straightish hairs, more or less glandular), stiff-membranaceous, dorsally scabrid-papillose and sometimes beset with a very few appressed hairs, ventrally somewhat antrorse-pilose especially along midvein and lesser veins with appressed and exceedingly slender hairs or finally glabrate, 8–26 cm. long and 4–7.5 cm. wide. Stipules (*fide auct.*) ±4 mm. long, caducous. Flowers monoecious, mostly clustered in distant fascicles of 2–5 and minutely bracteate in axillary racemes (these 2–10 cm. long), their pedicels pubescent and 3–15 mm. long, the terminal flower of the extreme or sometimes of several fascicles being pistillate, sometimes

only one or few pistillate flowers (without staminate) at and near the end of a much shorter rachis (*fide Hillebr.*). Ovary more or less setose especially above, styles spreading-recurved. Capsule antrorsely white-setose unless toward base, 5–6 mm. across and 4–5 mm. tall; seeds globose, rugose-scrobiculate, grayish over red, 2.6–3 mm. long.

Type specimen: Collected by *Edward Y. Hosaka*, no. 144, alt. 1,500 feet, Waianaeuka, Puu Kaala, Oahu, February 2, 1930 (Bish.).

Distribution: Kauai, Oahu, Molokai, Lanai, West Maui, and Hawaii.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 2,852, Kokee region, Kauai, August 13, 1938 (Goth.); *Hattie Davis*, alt. 2,500 feet, in the forest of Puu Kaala, Waianaeuka, Oahu, January 8, 1933 (Bish.); *Otto Degener* 3,718, in dark, wet jungle, between Glenwood and 29 Miles, Hawaii, June 15, 1929 (Berl.; Deg.; Del.; Field; Gray; Kew); *Degener* 7,994*a*, at base of Puu Kaala, near end of Schofield Fire-Break Trail, Oahu, March 13, 1932 (Berl.; Brit.; Deg.; Del.; Field; Gray; Kew; Mo.; Mun.; Par.);[1] *Degener* 7,994*b*, in dense, wet woods, same locality and date (Deg.); *Degener* 7,997, Oahu, October 9, 1932 (Berl.; Deg.; Field); *Degener* 7,999, in dense, rich woods, at base of Puu Kaala, near end of Schofield Fire-Break Trail, Oahu, February 11, 1928 (Berl.; Brit.; Deg.; Del.; Field; Gray; Kew; Mo.; Mun.; N. Y.); *Degener* 8,000, in dark, rich jungle, between Glenwood and 29 Miles, Hawaii, June 24, 1929 (Deg.); *Degener* 8,001, small tree in ravine, mountains *mauka* of Wahiawa, Oahu, November 25, 1926 (Berl.; Deg.; Field); *Degener* 8,002, in jungle, between Glenwood and 29 Miles, Hawaii, July 24, 1926 (Berl.; Deg.; Field; Gray; Par.); *Degener* 8,003 *pro parte*, in forest, along Kalalau Trail near Kokee, Kauai, July 4, 1926 (Deg.; Field; *cum var. tomentoso commixt.*); *Degener, Park, Potter, Bush, & Topping* 9,958, in forest, west side of Makaleha Valley, Oahu, July 21, 1935 (Degener); *Degener, Park, Y. Nitta, & Bush* 7,993, two trees seen in shaded gulch, monoecious, leaves pale on both sides, anthers pale blue, on north slope of South Halawa Gulch, Oahu, April 17, 1932 (Berl.; Brit.; Deg.; Del.; Field; Goth.; Gray; Kew; Mo.; Mun.; Mus. V.; N. Y.; Par.; U. S.); *Charles N. Forbes*, Waiopaa, Lanai, September 18, 1916 (Bish.); *Forbes 74–Mo*, Kalae, Molokai, June, 1912 (Bish.); *Forbes 77–M*, Wainee Gulch, West Maui, May,

[1] Degener states on his label: "Plants ordinarily dioecious but in several cases flower clusters on a pistillate tree on a single branch were all staminate and vice versa. Sexes, however, seem not to be mixed in same cluster. Anthers blue, aging to white."

1910 (Berl.; Bish.; Field; Gray); *Forbes* 808–*K*, Waimea Drainage Basin, west side, Kauai, July 3–August 18, 1917 (Berl.; Bish.; Field; Gray); *Forbes* 835–*K*, same locality and date (Bish.; Field); *Forbes* 1,035–*K*, near Kalalau Pali, Kauai, July 3–August 18, 1917 (Bish.); Forbes 1,286–*O*, Kahauiki Valley, Oahu, April 13, 1909 (Berl.; Bish.; Field); *Forbes* 1,823–*O*, Mokuleia, slopes of Puu Kaala, Oahu, April 26–May 16, 1912 (Bish.; Field; Gray); *Forbes* 2,253–*M*, lateral ridge, right-hand side of Olowalu Valley, Maui, May 7, 1920 (Bish.; Field); *D. Wesley Garber & Charles N. Forbes* 178 and 179, right fork of Wailupe Valley, Oahu, January 12, 1920 (Bish.); *Edward Y. Hosaka* 144 (type, Bish.); *Hosaka* 832, tree 15 feet tall, in moist, open gully, 2nd north fork, Kipapa Gulch, Waipio, Koolau Mountains, Oahu, November 13, 1932 (Berl.; Bish.; Field; Gray; Kew); *E. P. Hume* 460, tree, alt. 2,200 feet, on dry, wooded slope, Schofield Trail to Kaala, Oahu, April 3, 1932 (Field); *Rev. J. M. Lydgate*, Molokai (Berl.); *George C. Munro*, Kaiholena, Lanai, September 16, 1913 (Field); *Munro* 100–*L*, same locality and date (Bish.; Field); *Munro* 459, same locality, July 27, 1915 (Bish.); *K. Nitta* 7, alt. 2,000 feet, Puu Kaala, Oahu, October 13, 1929 (Deg.); *Jules Remy* 605, Maui, 1851–1855 (Par.); *Remy* (similarly) 605, Lanai, 1851–1855 (Par.); *Remy* 606, Hawaii, 1851–1855 (Field; Par., 2 sheets; approaching var. *glabrescens*); *Joseph F. Rock* 717, Hawaiian Isls. (Field); *Rock* 8,103, Mahana Valley, Lanai, August 2, 1910 (Berl.; Bish.; Field; Gray); *Olof H. Selling* 3,585, Waianae, Kaala, Oahu, September 25, 1938 (Goth.); *Carl Skottsberg* 991, in forests near Kokee Ranger Station, Kauai, October 28, 1922 (Bish.; Goth.); *Harold St. John* 10,416, small tree, 15 feet tall, alt. 2,700 feet, east ridge, Puu Hapapa, Waianae Mountains, Honouliuli, Oahu, March 16, 1930 (Bish.; Field; Gray); *St. John & Francis R. Fosberg* 13,762, trees 20 feet tall, trunk diameter 6 inches, alt. 2,500–3,300 feet, moist woods, Milolii Ridge, Waimea, Kauai, December 27, 1933 (Berl.; Bish.; Field; Gray; Kew); *St. John, Hosaka, Hume, and others* 10,820, same locality and date (Bish.; Field; Gray); *Amy Suehiro*, alt. 2,400 feet, Puu Kaala, Oahu, January 8, 1933 (Bish.); *T. Yoshioka*, alt. 2,200 feet, in woods on slopes of Puu Kaala, Waianaeuka, Oahu, November, 1933 (Bish.).

The var. *magnifolium* is the form commonly taken heretofore as representing *C. sandwicense* proper. The latter, however, has smaller leaves (the blade 7–10 rarely –13 cm. long and 2–3 rarely –5.5 cm. wide) and is known only from the southwestern corner of East Maui.

Claoxylon sandwicense var. γ **Hillebrandii** Sherff, Amer. Journ. Bot. 24: 89. 1937.

Leaves when dry often bluish-green. Flowers (at least the staminate ones) commonly 7–15-aggregated, more often sessile or subsessile (usually only 1–3 with pedicels), often intermixed with calloused areolae (these whitish, rounded, centrally depressed, 0.3–0.8 mm. wide); calyx lobes under 4 mm. long.

Type specimen: Collected by *William Hillebrand*, no. 175, Kohala Range, northwestern Hawaii (Bish.).

Distribution: Northwestern Hawaii.

Specimens examined: *Charles N. Forbes* 16–*H*, Puuwaawaa, June 8–14, 1911 (Berl.; Bish.; Field; Gray); *Hillebrand* 175 (type, Bish.); *Joseph F. Rock* 3,933, Puuwaawaa, June 15, 1909 (Bish.; Field); *Rock* 10,095, same locality, March, 1912 (Bish.); *Carl Skottsberg* 683, same locality, September 26, 1922 (Bish.; Goth.).

Hillebrand's plant had been labeled (I know not by whom), "*Claoxylon sandwicense* Müll. var." The essential characters of the inflorescence are found on examination of the specimens subsequently collected by *Forbes*, by *Rock*, and by *Skottsberg*, to have persisted constantly for more than half a century. Rock (Indig. Trees Haw. Isls. 255. 1913) noted the peculiarities of the plants from the type locality in the following words: "The plants from the latter locality [i.e., lava fields of Puuwaawaa] differ somewhat from those of other localities in that their leaves turn to a steel-blue color on drying, and some other minor points."

Claoxylon sandwicense var. δ **tomentosum** Hillebr. Fl. Haw. Isls. 399. 1888.

Leaves as in var. *magnifolium* but more hispid on lower surface (which is truly tomentose only when young, being moderately appressed-hispid at maturity); inflorescence said to be sometimes paniculate.

Type specimen: Collected by *Valdemar Knudsen*, Kauai (Berl.).

Distribution: Kauai.

Specimens examined: *A. Brodie* 4,035, Kauai (Bish.); *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 2,852*b*, along Kalalau Trail, Kokee region, August 20, 1938 (Goth.); *Otto Degener* 8,003 *pro parte*, in forest, along Kalalau Trail near Kokee, July 4, 1926 (Field; Kew; *cum var. magnifolio commixt.*); *Charles N. Forbes* 442–*K*, Kaholuamanu behind Waimea, September, 1909 (Bish.; Field; Gray); *Rev. J. M. Lydgate*, Olokele Valley (Bish.); *Lydgate* 7, same locality

(Bish.); *Horace Mann & William T. Brigham* 586, alt. 2,000–3,000 feet, Waimea, 1864–1865 (Bish.; Corn.; Field); *Joseph F. Rock* 1,807, Hawaiian Isls. (Bish.); *Rock* 2,075, Halemanu, February 14–26, 1909 (Bish.); *Rock* 5,595, alt. 3,700 feet, along trail and water-courses leading to Waialae Stream, September, 1909 (Bish.; Field; Gray); *Rock* 12,937, Kaholuamanu, October, 1916 (Bish.).

Wawra (Flora 58: 148. 1875) described *Claoxylon sandwicense*, for which he understood his own no. 2,078 (later named var. *tomentosum* by Hillebrand), as dioecious. Several of the specimens examined, however, are monoecious (as in the species proper) and it may well be that Wawra had unrepresentative specimens before him.

Heller (Minnesota Bot. Studs. 1: 843. 1897) incorrectly took his own no. 2,878 (from the edge of the plateau above Waimea, Kauai) as representing Hillebrand's var. *tomentosum*. He raised var. *tomentosum* to specific rank. Botanists since have quite generally accepted Heller's change. Heller's 2,878, however, is unlike the various other specimens which botanists have labeled, no doubt correctly, *tomentosum*. It has the fully expanded leaves densely and shortly silken-tomentulose underneath, the arcuate setulae forming a yellowish-brown coating particularly velvety to the touch. I have named it *C. Helleri* (p. 549). In var. *tomentosum* the fully grown leaves are moderately to subsparsely appressed-hispid beneath, the longer and usually straighter hairs being more whitish and giving a hispid rather than tomentose appearance to the lower surfaces of the leaves (*cf. Wawram loc. cit.*: "fol. novella tomentosa vetustiora glabrata").

Claoxylon sandwicense var. ϵ **glabrescens** (Sherff) comb. nov.; *Claoxylon sandwicense* var. *magnifolium* f. *glabrescens* Sherff, Amer. Journ. Bot. 24: 89. 1937.

Similar to var. *magnifolium* but with leaves more frequently membranaceous or papery-thin, more frequently bluish-purple when dry, and with rachis and pedicels of inflorescence becoming glabrous or at least glabrate.

Type specimen: Collected by *Harold St. John*, no. 17618, shrub 4 feet tall, alt. 2,200 feet, on wooded slope, Puu Kawiwi-Puu Kaala Ridge, Makaha, Oahu, March 31, 1935 (Bish.).

Distribution: Oahu, Lanai, and Hawaii.

Specimens examined: *Anonymous* (probably *Adelbert Von Chamisso* on Oahu; Field); *Chamisso*, see *Von Chamisso; Erling Christophersen* 3,699, tree, alt. 520 meters, in forest grove at head of valley

5, below Kanehoa, central Lualualei, Waianae Mountains, Oahu, June 15, 1932 (Berl.; Bish.; Field; Gray); *Otto Degener* 7,995, in open woods, third small valley northeast of Palikea, Oahu, September 19, 1932 (Berl.; Brit.; Deg.; Del.; Field, 2 sheets; Gray; Kew; Mo.; Mun.; Mus. V.; N. Y.; Petrop.; Phila.; U. S.; U. V.); *Degener* 7,996; in open thicket, west side of Pohakea Pass, Oahu, July 30, 1932 (Berl.; Brit.; Deg.; Del.; Field; Mun.; Mus. V.); *Degener, Kwan Park, & Yoshimasa Nitta* 7,998, near summit of Piko Trail, Makua Valley, Oahu, July 10, 1932 (Deg.; Field); *Charles N. Forbes*, Oahu, April 13, 1909 (Bish.); *Forbes* 13–*L*, Kaiholena Valley, Lanai, June, 1913 (Berl.; Bish.; Field; Gray; Kew; N. Y.; U. S.); *Forbes* 1,807–*O*, Mokuleia, slopes of Puu Kaala, Oahu, April 26–May 16, 1912 (Bish.; Field); *William Hillebrand*, Puu Kaala, Oahu (Berl.); *Hillebrand*, Nuuanu, Oahu (Berl.); *Hillebrand*, Lanai, July, 1870 (Berl.); *Hillebrand & Rev. J. M. Lydgate*, Hilo, Hawaii, April, 1871 (Bish.); *Edward Y. Hosaka & Otto Degener* 1,942, tree 20 feet tall, rare, on wooded, semi-moist gully, Keaau-Makua Forest Reserve, Makua, Waianae Mountains, January 13, 1938 (Bish.; Del.; Field); *Edward P. Hume* 527, alt. 2,200 feet, on steep, dry, wooded ridge, Makaha Valley, Waianae Range, Oahu, April 3, 1932 (Bish.); *George C. Munro* 20, Lanai (Bish.); *Munro* 256, Lanai (Bish.); *Harold St. John* 10,361, tree 20 feet tall, alt. 1,700 feet, on stream bank, north fork of valley east of Palikea, Waianae Mountains, Honouliuli, Oahu, February 23, 1930 (Berl.; Bish.; Del.; Field; Par.); *St. John* 11,608, small tree 15 feet tall, alt. 1,700 feet, on wooded bank above stream, Makaha Valley, Waianae Mountains, April 3, 1932 (Berl.; Bish.; Field); *St. John* 12,929, shrub 5 feet tall, alt. 2,000 feet, in wooded gulch, Puu Kaala, Waianaeuka, Oahu, January 8, 1933 (Bish.; Field); *St. John* 17,618 (type, Bish.: cotypes, Field; Gray); *St. John & Francis R. Fosberg* 12,128, tree 20 feet tall, alt. 1,300 feet, in moist woods, 2nd gulch east of Puu Kaupakuhale, northeast slope of Puu Kaala, Mokuleia, Oahu, October 23, 1932 (Bishop; Field); *Adelbert Von Chamisso* 65′, Oahu, 1817 (Berl.).

Claoxylon sandwicense var. ζ **Degeneri,** var. nov.

Varietati *magnifolio* similis sed differt: foliorum laminis late oblongis etiam subrotundatis, apice nunc rotundis nunc subtruncato-emarginatis, basi latissime cuneatis vel truncatis, principalium 6–9 cm. longis et 5–7.5 cm. latis.

Similar to var. *magnifolium* but differing in its leaf-blades; these broadly oblong or even subrotundate, at apex now rotund now

subtruncate-emarginate, at base very broadly cuneate or truncate, principal ones 6–9 cm. long and 5–7.5 cm. wide.

Type specimen: Collected by *Otto Degener*, no. 8,004, in Waimea Canyon near Kokee, Kauai, June 30, 1926 (Field).

Distribution: Northwestern Kauai.

Specimens examined: *Degener* 8,004 (type, Field: cotype, Berl.); *Harold St. John, Edward Y. Hosaka, Edward P. Hume, et alii* 10,814, alt. 3,500 feet, Nualolo Trail, Na Pali-Kona Forest Reserve, December 28, 1930 (Berl.; Bish.; Field; Gray; Kew).

This interesting variety is named after the collector of its type material, Mr. Otto Degener, to whom I am indebted for the encouragement originally to study the genus *Claoxylon* and for his wholehearted co-operation in assembling additional herbarium specimens for my study. *Rock* 5,593 and *St. John, Hosaka, Hume, et alii* 10,820*bis* (both collections at present inaccessible to me) were formerly suspected of being hybrids, the first between *C. Helleri* and *C. sandwicense* var. *tomentosum*, the second between *C. Helleri* and *C. sandwicense* var. *magnifolium*.[1] They both doubtless belong here. Rock's plants were collected on outskirts of forest below Kaholuamanu, Kauai, September, 1909 (Bish.; Field). The plants by St. John, Hosaka, Hume, and others came from woods, alt. 2,000–3,750 feet, Nualolo Trail, Na Pali-Kona Forest Reserve, Kauai, December 28, 1930 (Bish.; Field).

3. **Claoxylon Remyi** sp. nov.; *Claoxylon insigne* H. Baill. *ex* Drake del Castillo, Illustr. Fl. Insul. Mar. Pacif. 291. 1892 (nomen subnudum).

Ligneum, probabiliter arborescens, cortice griseo. Folia maxima, ramuli apicem versus conferta, opposita, suberecta, parce petiolata petiolo brevi (sub 1 cm. longo) conduplicato hispidulo marginato crassoque; lamina obovato-spathulata, apice obtusa, sub medio usque ad basim sensim angustata, margine integra vel obsoletissime minutissimeque denticulata, supra glabrata, infra hispidula, sicca utrinque minutissime numerosissimeque punctulata, ±3 dm. longa et ±1.1 dm. lata. Flores (forsitan monoici, unicus ad anthesin et 3 capsulae pro typo visae) solitarii in axillis, pedicellati pedicello dense minuteque hispido 2–4-nodoso (nodis cum bracteis oppositis ovatis 1–2 mm. longis) demum ±2.5 cm. longo. Calyx 4-partitus; sepalis ovato-rotundis, membranaceis, margine eroso-crenulatis et

[1] In my former treatment of this apparent hybrid (Amer. Journ. Bot. 24: 88. 1937), the words "var. *magnifolium*" were omitted through oversight.

subhyalinis, utrinque densissime pubescentibus, 4–9 mm. longis. Capsula distincte 4-partita et 4-loculata, circ. 2.5 cm. lata et 1.2–1.6 cm. alta, minutissime pubescens, coccis dorsaliter rotundatis et vix carinatis.

Ligneous, probably arborescent, with grayish bark. Leaves very large, clustered toward tip of branchlet, opposite, suberect, scarcely petiolate; petiole short (under 1 cm. long), conduplicate, hispidulous, marginate, thick; blade obovate-spatulate, at apex obtuse, gradually narrowed from below middle all way to base, marginally entire or very obsoletely and very minutely denticulate, glabrate above, hispidulous below, in dry state very minutely and very numerously punctulate on both surfaces, ±3 dm. long and ±1.1 dm. wide. Flowers (perhaps monoecious, a single one at anthesis and three at fruiting stage seen on type) solitary in axils, pedicellate; pedicel densely and minutely hispid, 2–4-nodose (nodes subtended with bracts, these opposite, ovate, and 1–2 mm. long), finally ±2.5 cm. long. Calyx 4-parted; sepals ovate-rotund, membranaceous, marginally erose-crenulate and subhyaline, on both surfaces very densely pubescent, 4–9 mm. long. Capsule distinctly 4-parted and 4-loculate, about 2.5 cm. wide and 1.2–1.6 cm. tall, very minutely pubescent, the cocci dorsally rounded and scarcely carinate.

Type specimen: Collected by *Jules Remy*, no. 604, on Island of Hawaii, 1851–1855 (Par.).

Distribution: Known only from Hawaii.

Specimens examined: *Remy* 604 (type, Par.).

A NEW SPECIES OF ALEURITES FORST.

Aleurites Remyi sp. nov.

Arbor, ramis ignotis. Folia longipetiolata petiolis teretibus irregulariter subalato-striatis breviter stellato-pubescentibus usque ad 2.5 dm. longis; lamina membranacea, irregulariter saepius 5-lobata, 1–2 dm. longa, inter sinus inferiores laterales 5–10 cm. lata, e basi truncata palmatim 5-venosa venis pennivenulosis et infra elatis, supra minute stellato-pubescenti, infra sparsissime vel secundum venas interdum moderate sed semper minute stellato-pubescenti; lobis basalibus recte divaricatis, subulato-linearibus, 1–4.5 cm. longis, apice paulum antroversis retroversisve; medianis linearilanceolatis, antroversis, 1.5–7 cm. longis; terminali ovato- vel lanceolato-oblongo, apice acuminato, utroque latere interdum obscure sinuoso vel obscurissime 1–4-lobulato, usque ad 1.3 dm. longo basi

extrema 6–8 cm. lato. Flores feminei ignoti; masculini forsitan iis *A. moluccanae* similes.

Tree, branches unknown. Leaves long-petioled; petiole terete, irregularly subalate-striate, shortly stellate-pubescent, up to 2.5 dm. long; blade membranaceous, irregularly more often 5-lobed, 1–2 dm. long, 5–10 cm. wide between the lower lateral sinuses, truncate at base, palmately 5-veined (the principal veins salient beneath and pinnately branched), minutely stellate-pubescent above, very sparsely or along the veins sometimes moderately but always minutely stellate-pubescent beneath; basal lobes straight-divaricate, subulate-linear, 1–4.5 cm. long, their tip bent slightly forward or backward; median lobes linear-lanceolate, directed forward, 1.5–7 cm. long; terminal lobe ovate- or lanceolate-oblong, at apex acuminate, on each side at times obscurely sinuous or very obscurely 1–4-lobulate, up to 1.3 dm. long, at extreme base (i.e., from base to base of subtending sinuses) 6–8 cm. wide. Pistillate flowers unknown; staminate flowers perhaps similar to those of *A. moluccana.*

Specimens examined: *Jules Remy* 600 *pro parte,* Hawaiian Isls., 1851–1855 (3 type sheets, Par.).

Remy collected considerable material of *Aleurites* in the Hawaiian Islands nearly a century ago, and this all was put under his number 600 in the Museum of Natural History at Paris. Most of the specimens are of the well known and widely distributed *A. moluccana* (L.) Willd. There are three sheets of mounted and several folders of unmounted material, however, which differ at once in the foliage and may be taken as typifying a new species. *A. moluccana* itself has long been noted for its variations in foliar size and outline. Some of its leaves are simple and some are variously 2–7-lobed; only a few are basally truncate, most of them being rounded or cordate; the lobes when present are normally short and broad or triangular, and particularly the terminal lobe is more or less deltoid, being about as broad at the extreme base as long (the only exception so far observed being a highly anomalous specimen collected by a Mr. Podmore above Kailua, on road to Holualoa, North Kona, Hawaii, in 1932, and deposited in Bishop Museum). *A. Remyi* differs conspicuously in its slender, elongate lateral lobes and its more or less oblong terminal lobe. Since *A. moluccana* is a species of very wide distribution (tropical Polynesia, a great part of Malaysia and the Philippine Islands, etc.) and never anywhere outside the Hawaiian Islands has been observed to produce leaves of this peculiar shape, and since the Hawaiian Islands are known definitely to abound in endemic forms,

there seems no doubt that Remy collected an undescribed, endemic species. I have searched through much material lent me from the Berlin Botanical Garden, the Museum of Natural History of Paris, the Bernice P. Bishop Museum of Honolulu, the large private herbarium of Mr. Otto Degener in Honolulu, the herbarium of Cornell University, and elsewhere, hoping to find that this strange species had been collected again since Remy's day, but in vain. Hillebrand (Fl. Haw. Isls. 400. 1888) gave only *A. moluccana*, as did Rock later, in his Indigenous Trees of the Hawaiian Islands (p. 255. 1913).

The first and second type sheets at Paris have small, detached portions of staminate inflorescence separately mounted. These are entirely typical for *A. moluccana*, but in view of Remy's having collected much *A. moluccana* material at the time and confused the two kinds under the same collection number 600, no reliance can be placed upon the floral characters thus displayed.

NOTES ON DRYPETES VAHL

Drypetes Forbesii sp. nov.

Arbor sine dubio dioica; unico ramulo viso griseo conferte lenticellato, internodiis 1–2.5 cm. longis, cortice sicco longitudinaliter ruguloso aliter glabro. Folia alterna, glaberrima; petiolo moderate gracili, circ. 9–12 mm. longo, recto vel aegre arcuato; lamina ovata vel interdum obovata, subcoriacea, apice obtusa vel vix acuminata, basi latissime cuneata vel fere subrotundata, 7–9 cm. longa et 4.2–5.8 cm. lata, penninervia nervis lateralibus principalibus circ. 6 jugis, infra pulcherrime reticulato-nervulosa, marginibus aegre serrata dentibus 7–13 pro utroque latere ±3–8 mm. longis sed sub 1 mm. altis. Stipulae (non visae) probabiliter caducae. Flores ignotae. Fructus normaliter in racemis axillaribus simplicibus vel rarius basim versus fasciculate 2- vel 3-ramosis 3–5-congregati, pedicello glabro, saepius recto, circ. 6–7 mm. longo; sepalis 4, ovatis, integris sed marginibus et faciebus (praesertim interiori) plus minusve hirsutis, demum patenti-recurvatis, circ. 2 mm. longis; staminibus rudimentariis brevissimis, siccis atris, antheris oblongis; disco 4-lobato lobis episepalis, deltoideo-ovatis, membranaceis, plus minusve serrulatis, ad fructus adstricto-adpressis, plerumque 1–2.5 mm. longis; ovario submaturo subobovato-globoso (itaque tereti vel subtereti), sicco atro, glabro, 8–11 mm. alto; stylo brevissimo (circ. 0.5 mm.), crasso; stigmate bifido, lobis reniformibus.

Tree, doubtless dioecious; a single branchlet seen, this gray and thickly lenticellate, internodes 1–2.5 cm. long, bark when dry length-

wise wrinkled but otherwise glabrous. Leaves alternate, very glabrous; petiole moderately slender, about 9–12 mm. long, straight or slightly curved; blade ovate or at times obovate, subcoriaceous, apically obtuse or barely acuminate, basally very broadly cuneate or almost subrotundate, 7–9 cm. long and 4.2–5.8 cm. wide, pennineryed with about 6 pairs of principal lateral nerves, very beautifully reticulate-nervulose beneath, each edge weakly serrate with 7–13 teeth, these ±3–8 mm. long but under 1 mm. tall. Stipules (not seen) probably caducous. Florets unknown. Fruits normally in axillary and simple or more rarely toward base fasciculately 2- or 3-branched racemes, the glabrous pedicel about 6–7 mm. long and more often straight; sepals 4, ovate, entire but marginally and facially (especially on inner face) more or less hirsute, finally spreading-recurved, about 2 mm. long; stamens rudimentary, very short, black when dry, their anthers oblong; disc 4-lobed; lobes episepalous, deltoid-ovate, membranaceous, more or less serrulate, tightly appressed to the fruit, commonly 1–2.5 mm. long; ovary submature, subobovate-globose (thus terete or subterete), black when dry, glabrous, 8–11 mm. tall; style very short (about 0.5 mm.), thick; stigma bifid, its lobes reniform.

Specimens examined: *Charles Noyes Forbes* 1,008–*O*, Konahuanui Ridge, Oahu, January 6, 1909 (type, Bish.).

Forbes had mistaken his plant for *Antidesma platyphyllum* Mann, which it resembled in foliage except for its narrower and longer petioles, but from which it differed at once *in not having the fruits strongly compressed and numerous on very short (1–4 mm.) pedicels in delicate racemose subdivisions of a lax panicle 4–10 cm. long.* Forbes' plant would belong in the Old World genus *Cyclostemon* Blume, now merged by Hutchinson (*in* Thistleton-Dyer, Fl. Trop. Afr. 6[1]: 674. 1912) and by F. Pax and K. Hoffmann (*in* Pax *in* Engler, Pflanzenreich IV. 147. xv. 237 et seq. 1922) and by F. Pax (op. cit. 229) with the New World *Drypetes* Vahl.

I have seen no staminate material. The species is undoubtedly very rare and perhaps on the road to extinction. A search should be made for additional material in the type locality to permit of amplifying the description and of determining the subgeneric affinities more precisely. Particularly will a study of the seed development and structure be advisable to note the presence or absence of an aril (vide infra).

J. F. Rock (Indig. Trees Haw. Isls. 243. 1913) described a related species from the Island of Hawaii, erecting for it a new genus, *Neo-*

wawraea, and designating it *N. Phyllanthoides*. His species has the leaves mostly thinner and larger, perfectly or essentially entire, and at base mostly cordate or subcordate. He describes the fruit as a globose berry "with persistent calyx." In *Drypetes Forbesii* the submature fruits have the disc-lobes closely adhering to the base, simulating a persistent calyx, but the real calyx, which is separated from the disc by a circle of rudimentary stamens, spreads out and has its four lobes more or less recurved. The effect in this case is to make the ovary seem, though falsely so, as if shortly and thickly stipitate. Wawra described the seeds of *Neowawraea* as being enclosed in an arillus. I have not been able to confirm or disprove this statement, the specimens of Wawra's species examined by me all having lacked good fruits. Unfortunately, Wawra seems to have overlooked *Cyclostemon* and *Drypetes* in classifying his new species, for he contrasted it only with the very different genera *Phyllanthus* and *Bischofia*. Likewise unfortunately, Pax (loc. cit.) overlooked Rock's proposed genus *Neowawraea* when monographing *Drypetes*. Thus the genus *Neowawraea* with its one species *Phyllanthoides* could not fairly be said to represent either Rock's or Pax's best judgment as to its validity. There appears, however, no warrant for longer maintaining *Neowawraea*. It is therefore referred here to *Drypetes* Vahl and its one described species renamed:

Drypetes Phyllanthoides (Rock) comb. nov.; *Neowawraea Phyllanthoides* Rock, loc. cit.

Specimens examined: *Erling Christophersen* 3,654, alt. ±600 meters, tree in open forest on valley side, Makua Valley, Oahu, April 20, 1932 (Bish.); *Otto Degener* 9,099, giant dying tree in forest, Kamokuiki Valley (between Puuiki and Puu Kamaohanui, Oahu, April 12, 1933 (Deg.); *Degener, Bush, Potter, Ordoñez, & Foster* 12,341, single dying, hollow tree in forest, Honouliuli Trail on southeast slope of Puu Hapapa, Oahu, May 21, 1939 (Berl.; Deg.; Del.; Field); *Degener & Charles Sheldon Judd* 11,010, huge tree with trunk 12 feet in circumference and in general resembling an old chestnut tree, almost extinct, on open, forested, valley side, southeast corner of Makua Valley, Oahu, September 27, 1932 (Berl.; Deg.; Field; Par.); *C. S. Judd*, alt. 1,200 feet, 250 yards below trail, near Milolii, Paaiki Valley, Kauai, July, 1932 (Bish.; referred by Judd to *Drypetes*); *H. K. Keppeler*, 100 feet oceanward of Government Road and about 1 mile south of Okoe boundary, Kapua, South Kona, Hawaii, "3 trees seen, all dying," December, 1932 (Bish.); *Noel H. Krauss*, alt. 800–1,000 feet, Piko trail, Kahanahaiki Valley, Waianae Mts.,

Oahu, December 30, 1933 (Field); *Alfred Meebold* (*Otto Degener* distrib. no.) 9,097, "only one tree which was found by Rock—this is dying," along Kau Road within 2–3 miles of new tourist rest-house on left-hand side 40 yards from road, Hawaii, May, 1932 (Deg.); *Harold St. John* 13,157, growing 20 feet tall with trunk 8 feet in diameter, top and center dead, part of main trunk and sprouts alive, alt. 1,800 feet, steep gulch, Pohakea Pass, Waianae Mts., Honouliuli Forest Reserve, Oahu, May 12, 1933 (Field); *St. John, E. Y. Hashimoto, E. Y. Hosaka, J. C. Lindsay, & D. D. Mitchell* 11,354, type tree, half dead, 25 feet tall, trunk diameter 2.5 feet, alt. 2,000 feet, Kapua on *aa*, South Kona, Hawaii, December 27, 1931 (Bish.).[1]

NOTES ON PHYLLANTHUS L.

Phyllanthus sandwicensis Muell. Arg. Linnaea 32: 31. *Circa* 1862; DC. Prodr. 15[II]: 389. 1862; *Phyllanthus distichus* Hook. & Arn. Bot. Beechey's Voy. 95. 1832 (*non P. distichus* [L.] Muell. Arg.); *Phyllanthus sandwicensis* var. *oblongifolius* Muell. Arg. locis cit.; *Phyllanthus sandwicensis* f. *grandifolia* Wawra, Flora 58: 149. 1875.

Specimens examined: *George Barclay*, Oahu, 1837 (Par.); *Frederick Debell Bennett*, Oahu, 1833–1836 (Berl.; native name, *ahli*); *William Allanson Bryan* 653, Pacific Heights, Oahu, December 20, 1903 (Bish.); *William Bush* (*Otto Degener* distrib. no.) 8,013, Helemanu (Helemano) Ridge, Oahu, June 23, 1929 (Deg., 2 sheets); *Adelbert Chamisso*, see *Von Chamisso; Erling Christophersen, Gerrit Parmile Wilder, & Edward Hume* 1,516, in forest, alt. 450–600 meters, Kuliouou, Oahu, February 5, 1931 (Bish.); *Christophersen, Wilder, & Hume* 1,523, same locality and date (Berl.; Bish.; Del.; Field; Gray; Par.); *Otto Degener* 2,464, Kuliouou Valley, near head of, on rocks, Oahu, December 11, 1927 (Deg.); *Degener* 4,145, in moderately dry forest, up Paumalu Ridge, Waialee, Oahu, October 18, 1931 (Deg., 2 sheets); *Degener* 8,015, on steep, rainy ridge, Waianae Valley up toward Mt. Kaala, Oahu, April 24, 1932 (Deg.); *Degener* 8,022, in rainy woods, along Manoa Cliff Trail, Oahu, February 6, 1927

[1] Mr. Degener mentioned (in herb.) that this species occurred also upon Molokai. He recently wrote Mr. Charles Sheldon Judd, Territorial Forester of the Hawaiian Islands, relative to the Molokai habitat and Mr. Judd replied (under date of May 16, 1939): "The *Neowawraea* which Russ found on Molokai was only a small tree. The last time he was up there he returned from Molokai and told me that the tree had died. . . . .There is a good specimen on Kauai, however, which I think you should add to your collection. It is in the region where the Kauai red cotton trees grow and I saw it there about three years ago. About the only person who knows how to locate it is Mr. Albert W. Duvel. It is in the region near Nualolo near the edge of the steep cliffs." It will be observed that the specimen already cited above as having been collected by Judd near Milolii, Paiiki Valley, came from "the region near Nualolo" and perhaps from the same tree.

(Deg.); *Degener* 8,023, usually 1.5–2 feet tall but where overshadowed growing to 4 or even 5 feet, Hauula, Oahu, November 13, 1927 (Deg.); *Degener* 8,024, on dry mountain near Waihee, West Maui, July 2, 1927 (Deg.); *Degener* 8,025, Oahu, February 20, 1927 (Deg.); *Degener* 8,027, near Oopuola Stream, East Maui, July 7, 1927 (Deg.); *Degener* 8,029, northeast of Nuuanu Valley, Oahu, November 20, 1926 (Deg.); *Degener & Emilio Ordoñez* 12,185, on dryish, forested slope, Kaaawa Gulch (mouth of Kaala), Oahu, August 2, 1938 (Berl.; Deg.; Field); *Degener, K. Park, Y. Nitta, O. Swezey, & D. L. Topping* 8,014, in forest, middle ridge of Niu Valley, Oahu, June 4, 1932 (Corn.; Deg., 2 sheets); *Frank E. Egler* 37–201, alt. 320 meters, in opening in forest, koa zone, at branch in stream, west Niu gulch, Oahu, July 20, 1937 (Bish.); *Abbé Urbain Faurie* 485, Koloa, Kauai, December, 1909 (Par.); *Faurie* 489, Kaala, Hawaii, November, 1909 (Del., 2 sheets; Par.); *Charles N. Forbes*, Waiolani Ridge, Oahu, December 10, 1908 (Berl.; Bish.; Field); *Forbes*, Mokuleia, slopes of Kaala, Oahu, April 26–May 16, 1912 (Berl.; Bish.; Field); *Forbes* 1,669–*O*, Puu-O-Kona, Oahu, March 14, 1911 (Bish.; Field); *Forbes* 2,021–*O*, ridge east of Kouliououiki, Oahu, November 17, 1914 (Bish.; Field); *Forbes* 2,372–*M*, upper part of Olowalu Valley, Maui, May 14, 1920 (Berl.; Bish.; Field); *Francis Raymond Fosberg* 12,358, growing 5 dm. tall, alt. 400 meters, on dry, brushy ridge, south side of Makua Valley, Waianae Mts., Oahu, November 17, 1935 (Bish.; Field); *D. Wesley Garber* 423, Manoa Cliff Trail, Oahu, June 13, 1920 (Bish., 2 sheets); *Gaudichaud*, Hawaiian Isls. (Par.); *Gaudichaud* 288, Hawaiian Islands, September and October, 1836 (Par., doubtless type material); *A. A. Heller* 2,196, on the ridge west of the Hanapepe River, Kauai, August 6, 1895 (Corn.; Par.); *William Hillebrand*, Waianae, Oahu (Berl.); *Hillebrand*, Niu, Oahu (Berl.); *Albert S. Hitchcock* 15,225, alt. 1,400 feet, Olokele Gulch, Kauai, October 18, 1916 (U. S.); *Edward P. Hume*, alt. 600 meters, north ridge, Kaaawa, Oahu, April 12, 1931 (Bish.); *Hume* 389, alt. 2,100 feet, open ridge, Puu Hapapa, Waianae Mts., Oahu, December 1, 1931 (Bish.); *Horace Mann & William T. Brigham*, Hawaiian Islands (Bish.); *Mann & Brigham* 104, Oahu (Bish.; Corn., 2 sheets); *Mann & Brigham* 435 and 436, Hawaiian Isls. (Bish.); *H. Ochiae* (*Otto Degener* distrib. no.) 8,031, Oahu, November 20, 1926 (Deg.); *Olaf Oswald & Gertrude E. Douglas* 466, alt. about 2,000 feet, Middle Ridge Trail, Niu, Oahu, July 29, 1928 (Corn.); *Jules Remy* 601, Maui, 1851–1855 (Berl.; Field); *Joseph F. Rock* 4,811, Niu Valley, Oahu, August 22, 1909 (Bish.); *Billie Seamster* (*Otto Degener* distrib. no.) 8,035, trail near

hair-pin turn, Nuuanu Pali, Oahu, November 20, 1926 (Deg.); *Carl Skottsberg* 302, Palehua, Waianae Mts., Oahu, August 23, 1922 (Bish.); *Skottsberg* 398, Makaleha Valley, Waianae, Oahu, August 30, 1922 (Bish.); *D. LeRoy Topping* 2,748, Niu Ridge, Oahu, September 7, 1924 (Deg.); *Topping* 3,039, Makaleha Valley, Oahu, February 22, 1925 (Deg.); *Adelbert Von Chamisso* 192, Oahu (Berl.; labeled by Mueller-Argau for his var. *oblongifolius*).

Mueller (loc. cit.) described his *Phyllanthus sandwicensis* rather generally and followed it with a detailed description of four proposed varieties: α *oblongifolius*, β *ellipticus*, γ *parvifolius*, and δ *radicans*. Unlike most authors, Mueller frequently used the *alpha* position for a variety different from the species proper and the *beta* position for the var. *genuina*. In the present case, however, he described no var. *genuina* and his *alpha* var. *oblongifolius* may be taken as typifying the species proper. Indeed, in his treatment for De Candolle's Prodromus, Mueller cited *P. distichus* Hook. & Arn. (*nec alior.*) as synonymous with his own *P. sandwicensis* proper, and *P. distichus* Hook. & Arn. as identical with the var. *oblongifolius* Muell. Arg. Doubtless because of these facts, Hillebrand (Fl. Haw. Isls. 401. 1888) retained essentially the description of α *oblongifolius* for *P. sandwicensis* proper and excluded Mueller's other three varieties, placing them all under one unnamed var. β. I have recently examined (and again have before me) a number of original specimens collected by Gaudichaud and by Chamisso, and specimens principally cited by Mueller for his varieties. From these it becomes evident, in the light of numerous additional specimens collected since Mueller's time, that Hillebrand's judgment, as far as Mueller's four varieties were concerned, was sound. Hillebrand, as already implied however, did not exercise his right to choose from among Mueller's varietal names one to be retained. Since I can find in literature no formal treatment of this matter made by anyone else and a choice of names must be made in accordance with the present-day International Rules, I here choose Mueller's var. β *ellipticus* to stand for Hillebrand's var. β exclusive of material from the Islands of Molokai and Lanai, and thus to include Mueller's vars. β,γ, and δ (also *P. sandwicensis* f. *parvifolius* Wawra, Flora 58: 149. 1875).

Specimens of *Phyllanthus sandwicensis* var. *ellipticus* examined: *Anon.* (*Otto Degener* distrib. no.) 8,034, trail near hair-pin turn, Nuuanu Pali, Oahu, November 20, 1926 (Deg.); *Adelbert Chamisso*, see *Von Chamisso; Erling Christophersen* 1,272, alt. 400–500 meters, Kalihi Pali, Oahu, March 11, 1930 (Bish.; Field); *Christophersen*,

Wilder, & Hume 1,503, in open forest, alt. 3–500 meters, head of Kalihi Valley, Oahu, January 25, 1931 (Berl.; Bish.; Field; Del.); *Otto Degener* 8,028, rocky ridge northeast of Kipu, Kauai, June 17, 1926 (Deg.); *Degener, Salucop, & Arlantico* 11,645, in decadent forest, alt. 1,500 feet, Kawaihapai, Oahu, January 1, 1938 (Berl.; Deg.; Field; etc.); *Degener & C. L. Shear* 8,026, on Konahuanui and Honolulu side of Nuuanu Pali, Oahu, February 6, 1928 (Corn.; Deg., 2 sheets); *F. Didrichsen* 3,535, Oahu, 1845–1847 (Bish.); *Abbé Urbain Faurie* 462, Kalihi Pali, Oahu, October, 1909 (Bish.; Brit.; Par.; type material of *Euphorbia multiformis* var. *microphylla* Lévl. *in* Fedde, Repert. 10: 151. 1911 [*non* Boiss.]); *Charles N. Forbes* 720–*K*, left-hand side of Kipu Kai Gap, Haupu Range, Kauai, November 1, 1916 (Bish.); *Forbes* 1,046–*O*, ridge, west side of Nuuanu Valley, Oahu, January 20, 1909 (Field); *Forbes* 1,269–*O*, Moanalua Valley, Oahu, April 6, 1909 (Berl.; Bish.; Del.; Field); *Forbes* 1,426–*O*, west side of Nuuanu Valley, Oahu, December 17, 1909 (Bish.; Field); *Forbes* 1,520–*O*, Nuuanu Pali, Oahu, June 17, 1909 (Field); *Forbes* 1,585–*O*, Popouwela, Waianae Range, Oahu, April 27, 1910 (Field); *Forbes* 2,490–*O*, Manoa Cliff trail, May 1, 1917 (Bish.; Field); *Francis R. Fosberg* 12,189, alt. 375 meters, on dry rock ledges, north ridge of Kahaluu Valley, Koolau Mts., Oahu, July 4, 1935 (Berl.; Bish.; Field); *Fosberg* 14,126, alt. 100–150 meters, crevice in moist basalt cliff, Sacred Falls, Kaluanui Gulch, Koolau Mts., Oahu, June 20, 1937 (Bish.); *Gaudichaud*, Hawaiian Isls., October, 1836 (Del.; determined by Mueller-Argau for his var. *parvifolius*); *Gaudichaud* 289, same locality and date (Del.); *Gaudichaud* 290, same locality and date (Berl.; Del.; Par.; type collection); *Amos Arthur Heller* 2,196, at the Pali, Oahu, April 23, 1895 (Field); *Heller* (similarly) 2,196, Nuuanu Pali, Oahu, October 29, 1895 (Bish.; Field); *William Hillebrand*, Oahu (Berl., 2 sheets; labeled by Hillebrand for his var. β); *Edward Yataro Hosaka* 1,329, plant 2 feet tall, on wooded head of gully, alt. 1,500 feet, Kealia, Waianae Mts., Oahu, February 2, 1936 (Berl.; Bish.; Field); *Edward P. Hume* 348, alt. 1,800 feet, open side hill, Manoa Cliff trail, Koolau Mts., Oahu, November 28, 1931 (Bish.); *Rev. J. M. Lydgate*, Mahaulepu, Kauai (Bish.); *Horace Mann & William T. Brigham* 515, Hawaiian Isls. (Bish.); *Jules Remy* 603, Oahu, 1851–1855 (Field; Par.); *Billie Seamster* (*Otto Degener* distrib. nos.) 8,032 and 8,033, south side of Nuuanu Pali road, Oahu, December 5, 1926 (Deg.); *Adelbert Von Chamisso* 191, Oahu (Berl., where labeled by Mueller-Argau for his var. *ellipticus;* Petrop.); *Von Chamisso* 192, Oahu (Petrop.).

In general, *P. sandwicensis* proper has leaves of ovate to lanceolate shape and more often from 3 to 8 cm. long, while var. *ellipticus* has leaves mostly ovate-oblong, broadly oblong, or suborbicular, and usually 1–3 cm. long. In both forms there is manifest a tendency to have larger leaves above and smaller ones below. Many sheets of var. *ellipticus* in herbaria display sprays with leaves mostly 1.5–2.5 cm. long and sprays with smaller leaves scarcely or little more than half as long. Frequently entire plants, especially from situations exposed to strong winds, have these smaller leaves and then are Mueller's "var. *parvifolius*." Occasionally, the lower branches are more or less prostrate and root here and there, the plants then typifying Mueller's "var. *radicans*." Very rarely, *P. sandwicensis* proper produces a dwarf, leafy form with leaves elliptic-lanceolate and mostly 0.7–2 cm. long. An example of this rare state was collected by Hillebrand at Waianae, but was incorrectly referred by him to var. *parvifolius* Muell. Arg.

Hillebrand (loc. cit.) stated that *P. sandwicensis* proper was found on all of the Hawaiian Islands. The plants found on Molokai and Lanai, however, seem varietally different. They have the twigs commonly more conspicuously 2-winged above, the leaves somewhat more venulose, and the axillary pulvini not hemispherical as in *P. sandwicensis* proper, but elongate-cylindric. In the Lanai material the pulvini are commonly multiple or branched and the entire plant, including even the leaves, has a more or less reddish hue. The Molokai material may be separated as:

Phyllanthus sandwicensis Degeneri var. nov.

Ramuli superne plus alati, pulvinis cylindricis ac plus elongatis.

Branchlets more alate above, axillary cushions cylindric and more elongate.

Specimens examined: *Otto Degener* 8,019 among shrubs in windy, exposed region, on cliffs overlooking Kalaupapa Leper Settlement, Molokai, June 18, 1928 (type, staminate, Field); *Degener* 8,020, among shrubs in windy, exposed situation, on cliffs overlooking and east of Kalaupapa Leper Settlement, Molokai, June 19, 1928 (pistillate, Field); *Degener* 8,021, Halawaiki Gulch, Molokai, June 21, 1928 (Deg.); *Degener & Kazuto Nitta* 8,018, in rainy forest, Wailau Valley, Molokai, August 11, 1928 (Field); *Abbé Urbain Faurie* 484, alt. 1,000 meters, Kamolo, Molokai, June, 1910 (Del., 2 sheets; Par.); *Charles Noyes Forbes* 42–*Mo*, Kalae, Molokai, June, 1912 (Bish.; Field); *Forbes* 431–*Mo*, Kalapamoa, Molokai, August, 1912

(Bish.); *Francis Raymond Fosberg* 13,399, shrub up to 1 meter tall, alt. 600 meters, edge of moist forest, Manawai-Kahananui ridge, Molokai, December 24, 1936 (Berl.; Bish.; Field); *Jules Remy* 601, Molokai, 1851–1855 (Par.); *Joseph F. Rock* 10,104, Halawa Valley, Molokai, April, 1910 (Bish.).

The Lanai material has already been described by Fosberg (Occas. Paps. Bish. Mus. 12: 15: 6. 1936) as forma *rufidus* of *Phyllanthus sandwicensis* var. *oblongifolius*. The var. *oblongifolius*, however, is really synonymous with *P. sandwicensis* proper (as stated above), while the Lanai material is co-varietal with that of Molokai. Fosberg's plant may therefore be designated as:

Phyllanthus sandwicensis var. **Degeneri** f. **rufidus** (Fosb.) comb. nov.

Specimens (of f. *rufidus*) examined: *Charles Noyes Forbes* (*G. C. Munro* distrib. no.) 19, Lanai (Bish.); *Forbes* 45–*L*, mountains near Koele, Lanai, June, 1913 (Berl.; Bish.; Del.; Field); *Francis Raymond Fosberg* 12,410, alt. 950 meters, in moist, open, brushy forest, Haalelepaakai, Lanai, November 28, 1935 (Bish.; isotype), *Fosberg* 12,510, shrub 1 meter tall, alt. 850 meters, in moist, brushy forest, on ridge north of Kaiholena Gulch, Lanai, November 30, 1935 (cotypes, Bish.; Field); *William Hillebrand*, Lanai, 1870 (Berl.); *George C. Munro* 118, Kaiholena, Lanai, August (Bish.).

Phyllanthus nivosus W. G. Smith, Floral Mag. *pl. 120.* 1874; *Phyllanthus sandwicensis* var. *hypoglaucus* Lévl. *in* Fedde, Repert. Spec. Nov. 10: 124. 1911.

Léveillé's *P. sandwicensis* var. *hypoglaucus* was based on Faurie 483, *in sepibus*, Hilo, Hawaii, May, 1909. Faurie's specimen examined by me (Par.) shows that Léveillé's variety, like so many others of his proposed "novelties," was merely a well known cultivated species, *P. nivosus* W. G. Smith.

NOTES ON ANTIDESMA L.

Antidesma platyphyllum Mann, Enum. Haw. Pl. no. 444 (Proc. Amer. Acad. 7: 202). 1867.

Fosberg (Occas. Paps. Bish. Mus. 12: 15: 7–8. 1936) has presented a key to the species and varieties of *Antidesma* for the Hawaiian Islands. For *A. platyphyllum* proper (i. e., var. *genuinum* Pax & Hoffm.) as listed by him without specimens, I present herewith the following list:

Specimens examined: *Brodie* 4,032, Kauai (Bish.); *Edwin H. Bryan, Jr.*, 804, small tree 3–4 meters tall, in rain-forest on ridge,

alt. 1,700 feet, Kawailoa, Oahu, October 2, 1934 (Bish.); *Bryan* 852, small tree 4–5 meters tall, fruit green to purple, in lower forest-zone 1, on valley slope, alt. 2,100 feet, Haleauau Valley, Oahu, November 13, 1934 (Bish.); *Bryan, Amy Suehiro, & M. Fukuda,* alt. 1,200–1,400 feet, zone 2, south ridge of Kipapa Gulch, Waipio, Koolau Mts., Oahu, May 15, 1932 (Bish.); *Will Bush* (*Otto Degener* distrib. no.) 8135, Helemano Ridge, Oahu, June 23, 1929 (Deg.); *Erling Christophersen* 1,374, alt. about 500 meters, north slope of Tantalus, Oahu, July 15, 1930 (Berl.; Bish.; Field); *Christophersen* 1,376, same locality and date (Berl.; Bish.; Field); *Otto Degener,* in woods, Kahuaawi Gulch, Molokai, June 5, 1928 (Field); *Degener* 8,122, on dry hillside, Mokomoko Gulch, Molokai, June 7, 1928 (Deg.); *Degener* 8,123, in forest, Kahuaawi Gulch, Molokai, June 5, 1928 (Deg., 2 sheets); *Degener* 8,125, ravine northwest of Puu Makaliilii (where precipice makes further descent impossible), Molokai, May 22, 1928 (Deg.); *Degener* 8,127, Hawaiian Islands, November 16, 1930 (Deg.; Field); *Degener* 8,132, in forest, between summit of Piko Trail and top of Kahanahaiki Valley, Oahu, July 18, 1932 (Deg.); *Degener* 8,136, in wet jungle, between Glenwood and 29 Miles, Hawaii, June 18, 1929 (Deg.); *Degener* 8,144, in forest reserve, on slope of summit of mountain, Kohala, Hawaii, August 8, 1926 (Deg., 2 sheets); *Degener* 8,145, between Glenwood and 29 Miles, July 27, 1926 (Deg.); *Degener* 10,881, in forest, Tantalus crater rim, Oahu, November 12, 1935 (Field); *Degener & Kwan Kee Park* 8,128, in rain-forest, Pig-God Trail, Punaluu, Oahu, August 11, 1931 (Deg., 2 sheets); *Degener, Park, Topping, & Bush* 8,129, same locality, May 31, 1931 (Deg.); *Degener, Takamoto, & Martinez* 10,538, forest tree, C. C. C. Trail, Aiea, Oahu, March 15, 1936 (Deg.; Field); *G. R. Ewart III* no. 10, in forest, alt. 1,800 feet, near top of Kapalama-Waolani Ridge, Oahu, January 10, 1929 (Bish.); *Abbé Urbain Faurie* 308, alt. 1,200 meters, Olinda, East Maui, August, 1909 (Bish.; Par.); *Charles Noyes Forbes,* Maui, 1920 (Berl.; Bish.; Field; leaves slightly hispidulous beneath near midnerve); *Forbes,* Waiolani back of Honolulu, Oahu, July 8, 1908 (Bish.; Field); *Forbes,* Waialae Iki, Oahu, October 10, 1908 (Bish.); *Forbes* 90–*M,* Iao Valley, West Maui, June, 1910 (Berl.; Bish.; Field); *Forbes* 232–*M,* in woods east of Makawao, East Maui, July, 1910 (Bish.; Field); *Forbes* 250–*L,* mountains at east end of Lanai, June, 1913 (Berl.; Bish.; Del.; Field; Par.); *Forbes* 345–*H,* Kapua, Kona, Hawaii, July 23, 1911 (Berl.; Bish.; Field; leaves very obscurely setulose beneath, thus somewhat approaching those of var. *hamakuaense*); *Forbes* 420–*M,* Honokahau

Drainage Basin, West Maui, September 25–October 17, 1917 (Berl.; Bish.; Field); *Forbes* 1,039–*H*, Volcano Road, Hawaii, July 2, 1915 (Bish.); *Forbes* 1,634–*M*, above the plantation, Kipahulu Valley, East Maui, November 13, 1919 (Berl.; Bish.; Field); *Forbes* 2,336–*M*, central ridge of Olowalu Valley, West Maui, May 12, 1920 (Bish.); *Forbes* 2,613–*M*, Waikamoi Trail, East Maui, June 25, 1920 (Bish.); *Francis Raymond Fosberg* 10,393, tree 5 meters tall, drupes dark red, in wet forest, alt. 250 meters, ditch trail, Kahana Valley, Kahana, Oahu, November 26, 1933 (Bish.); *Fosberg* 10,415, tree 5 meters tall, drupes dark red, alt. 250 meters, in wet forest, ditch trail, Kahana Valley, Kahana, November 26, 1933 (Bish.); *Fosberg* 10,817, tree 8 meters tall, fruit black, on steep, wooded slope, alt. 800 meters, Haleanau Valley, Puu Kaala, Waianaeuka, Oahu, February 24, 1937 (Bish.); *Fosberg & K. Duker* 8,787, tree 12 meters tall, in wet forest, alt. 300 meters, Waikane-Schofield Trail, Waikane, Koolau Mts., Oahu, October 16, 1932 (Bish.); *Fosberg & St. John* 8,897, alt. 500 meters, in wet forest at head of 2nd gulch east of Puu Kaupakuhale, Mokuleia, Oahu, October 23, 1932 (Bish.); *Fosberg* 10,933, tree 6 meters tall, alt. 815 meters, in dry forest, Forest Reserve house, southeast of Palikea, Waianae Mts., Oahu, June 30, 1935 (Bish.; Field); *Fosberg* 10,969, tree 8 meters tall, alt. 800 meters, on wet, wooded ridge above Kupehau, Waianae Mts., Oahu, June 30, 1935 (Bish.; Field); *Fosberg* 13,490, tree 7 meters tall, fruits reddish-black, in wet, open forest, alt. 450 meters, trail up Waiakeakua-Waiokeela ridge, head of Wailau Valley, Molokai, December 29, 1936 (Bish.); *Fullaway & Giffard*, 10 Miles, Hawaii, August, 1919 (Bish.; leaves slightly pubescent beneath, especially near median nerve); *Fullaway & Giffard*, 23 Miles, Hawaii, August 9, 1919 (Bish.; leaves pubescent beneath along midnerve); *D. Wesley Garber* 485, Pauoa-Konahuanui trail, Oahu, July 11, 1920 (Bish.); *Garber & Forbes* 177, right fork of Wailupe Valley, Oahu, January 12, 1920 (Bish.); *William Hillebrand*, Oahu (Berl.; leaves pubescent beneath along midnerve); *Hillebrand* Kalae, Molokai (Berl.); *Hillebrand*, woods of Pumelei, Hawaii (Berl.); *Hillebrand & Rev. J. M. Lydgate*, Makawao, East Maui (Bish.); *Edward Yataro Hosaka* 72, on wooded slope, alt. 2,000 feet, Puu Manawahua, Waianae Mts., Oahu, December 8, 1929 (Bish.); *Hosaka* 715, tree 15 feet tall, on wet, denuded ridge, south ridge, Kipapa Gulch, Waipio, Oahu, September 18, 1932 (Bish.); *Hosaka* 926, tree 20 feet tall, in moist woods, alt. 1,500 feet, south ridge, Kipapa Gulch, Waipio, Oahu, March 5, 1933 (Bish.); *Hosaka* 1,109, tree 20 feet tall, alt. 2,000 feet, on wet, denuded ridge, south ridge,

Kipapa Gulch, Waipio, Oahu, July 2, 1933 (Berl.; Bish.; Del.; Field); *Hosaka* 1,203, tree 10 feet tall, on denuded ridge, Kipapa Gulch, August 8, 1933 (Bish.); *Edward P. Hume* 212, tree on wooded ridge, alt. 1,200 feet, Puu Peahinaia, Koolau Mts., Oahu, October 4, 1931 (Field); *Frank Kitamura*, in moist, wooded region, alt. 950 feet, Hauula Forest Reserve, Kahana Valley, Oahu, December 10, 1933 (Bish.); *Rev. J. M. Lydgate*, Molokai (Berl.); *Horace Mann & William T. Brigham* 427, woods near Makawao, East Maui (Corn.); *William Meinecke*, in woods, alt. 1,500 feet, Manana-Waimano ridge, Oahu, April 9, 1933 (Bish.); *Meinecke*, in a saddle at about 1,800 feet alt., Waikakalaua-Kipapa Ridge, Oahu, June 12, 1933 (Bish.); *George C. Munro* 63, Aukuu Hill, Lanai, October 5, 1913 (Bish.); *Munro* 138, Pohaku, Lanai, October 5, 1913 (Bish.; Field); *Kazuto Nitta* 8,146, on moderately dry slope, Mt. Kaala, Oahu, October 13, 1929 (Deg.); *Jules Remy* 609 *pro parte*, Hawaiian Isls., 1851–1855 (Par.); *Joseph F. Rock* 4,593, Hiilawe, Waipio, Hawaii, July 18, 1909 (Bish.); *Rock* 4,836, Palolo Valley, Oahu (Berl.; Bish.; Field); *Rock* 10,096, "Kailua lower ditch trail," East Maui, May, 1911 (Bish.); *Rock* 10,097, Kapua, South Kona, Hawaii, January, 1912 (Bish.); *Harold Saint-John* 9,911, bushy tree 15 feet tall, alt. 2,200 feet, ridge of Puu Manawahua, Waianae Mts., Oahu, September 29, 1929 (Bish.); *St. John* 10,572, alt. 1,100 feet, on wooded slope in Waikakalaua Gulch, Waipio, Koolau Mts., Oahu, September 14, 1930 (Bish.); *St. John* 10,613, small tree on wooded ridge, alt. 1,700 feet, Paalaa, South Opaeula Gulch, Oahu, November 9, 1930 (Bish.); *St. John* 11,184, tree 25 feet tall, common, fruit dark purplish, alt. 1,800 feet, on wooded ridge, main ridge running southwest from Puu Lanihuli, Kalihi-Nuuanu, Oahu, November 29, 1931 (Berl.; Bish.; Del.; Field; Par.); *St. John & Fosberg* 13,957, tree 25 feet tall with trunk 8 inches thick, in moist woods, alt. 950 feet, Wainiha Valley, side gulch on west side, 0.75 mile upstream from intake, Kauai, January 1, 1934 (Field); *Carl Skottsberg* 54, on ridge back of Tantalus, Oahu, August 7, 1922 (Bish.); *Skottsberg* 337, Palehua Camp, Waianae, Oahu, August 24, 1922 (Bish.); *Amy Suehiro*, Laie Ridge, Oahu, February 14, 1932 (Bish.); *D. LeRoy Topping* 2,869, tree 30 feet tall, in gulch back of Schofield, Oahu, September 21, 1924 (Deg.); *Topping* 3,199, Manoa Cliff Trail, Oahu, April 12, 1925 (Deg.).

Antidesma platyphyllum var. **genuinum** f. **rubrum** Degener & Sherff, f. nov.

A var. *genuino* sensu stricto fructibus maturis rubris non purpureo-atris differt.

Differs from var. *genuinum* proper in having mature fruits red instead of purplish-black.

Specimens examined: *Otto Degener* 8,131, in rain-forest, Pupukea-Kahuku trail at divide, Oahu, January 24, 1932 (type, Field).

Degener's label states: "Mature fruit red! Only 1 tree of that color seen. All others, and there were many, had purple-black fruit. This is fruiting season." The dried fruits of the type sheet are now blackish and would pass for those of the variety *genuinum* proper.

It is possible that a number of the specimens above cited for *A. platyphyllum* proper were really this forma. A wide range of colors, from dull reddish to deep blackish-purple, was observed in the dried fruits. However, none of the fruits had been noted when fresh as other than reddish-black or purplish-black.

Antidesma platyphyllum var. **hamakuaense** Fosberg, Occas. Paps. Bish. Mus. 12: 15: 8. 1936.

Fosberg cited for this variety only three specimens, all of them from the Island of Hawaii. I have had the privilege of examining no fewer than eleven specimens, one of them from Oahu, and present herewith an amplified list of:

Specimens examined: *Erling Christophersen* 1,375, alt. about 500 meters, north slope of Tantalus, Oahu, July 15, 1930 (Bish.; Field; in no way intergrading with *Christophersen* 1,376 of species proper!); *Otto Degener* 8,142, in wet jungle, between Glenwood and 29 Miles, Hawaii, July 23, 1926 (Deg.); *Charles N. Forbes* 650–*H*, Olaa Flume, Hawaii, June 2, 1915 (Bish.); *Francis Raymond Fosberg* 10,461, bush 3 meters tall, alt. 435 meters, in wet forest, hills above Akaka Falls, Honomu, Hawaii, December 8, 1933 (Bish.); *Fosberg* 10,506, shrub 3 meters tall, alt. 460 meters, in wet forest, side of gulch, Awehi Stream above Hilo, Hawaii, December 7, 1933 (Bish.); *William Hillebrand & Rev. J. M. Lydgate*, Hawaiian Isls. (Bish., *cum A. pulvinato commixt.*); *Jules Remy* 609 *pro parte*, Hawaii, 1851–1855 (Par.); *Joseph F. Rock* 4,327, Paauhau 3, Hawaii, July 5, 1909 (Bish.); *Carl Skottsberg* 478, Puu Kauku, Makahanaloa, Hawaii, September 11, 1922 (Bish.); *Skottsberg* 1,975, alt. 800 meters, Kukaiau ranch, northeast slope of Mauna Kea, Hawaii, September 29, 1926 (Bish.; leaves pubescent beneath on nerves).

Antidesma platyphyllum var. **Hillebrandii** Pax & Hoffm. *in* Engler, Pflanzenreich IV. 147. xv. 162. 1922; *A. platyphyllum* var. β Hillebr. Fl. Haw. Isls. 403. 1888.

Fosberg (loc. cit.) stated that "all the antidesmas from Kauai apparently belong to this variety." *Skottsberg* (Meddel. Göteborgs Botan. Trädgård 10: 120. 1936) somewhat earlier had confessed doubt that this variety deserved to be distinguished under a special name. My own judgment, after an extended examination of much herbarium material, is that the variety is a valid one but that, contrary to Fosberg's somewhat qualified opinion, the Island of Kauai harbors at least one other variety of *A. platyphyllum* (vide *A. platyphyllum var. subamplexicaule* infra). For the var. *Hillebrandii* I present the following list of:

Specimens examined: *Brodie* 4,033, Kauai (Bish.); *Otto Degener* 8,141, on dry slope overlooking Waimea Canyon, along road leading to Kokee, Kauai, June 22, 1926 (Deg.); *Francis R. Fosberg* 12,649, tree 8 meters tall, in moist forest, alt. 1,100 meters, southeast side of Kumuwela Ridge, above Waimea Canyon, Kauai, December 28, 1935 (Bish.); *Amos Arthur Heller*, Kauai, 1895 (Bish., 2 sheets); *Heller* 2,497, on the ridge west of the Hanapepe River, Kauai, July 11, 1895 (Corn., 2 sheets; Field; Par.); *Heller* (similarly) 2,497, same locality, August 6, 1895 (Field); *Heller* (similarly) 2,497, on Kaholuamanu, above Waimea, Kauai, September 2–9, 1895 (Corn.); *Heller* (similarly) 2,497, same locality, September 10–16, 1895 (Field); *Heller* (similarly) 2,497, same locality, October 11–16, 1895 (Del.); *V. Knudsen* 112, Kauai (Berl., type); *Jules Remy* 611, Kauai or Niihau, 1851–1855 (Par.); *Joseph F. Rock* 1,752, Kaholuamanu, Kauai, March 3–10, 1909 (Bish.); *Rock* 5,320, alt. 3,200 feet, below Gay's mountain house, Kaholuamanu Forest, Kauai, September, 1909 (Berl.; Bish.; Field); *Rock* 12,935, Kaholuamanu, October, 1911 (Berl.; Bish.; Field); *Rock* 17,092, same locality, October, 1916 (Bish.); *Saint-John, Hosaka, Hume, et alii* 10,811, alt. 2,600 feet, in woods, Nualolo Trail, Na Pali-Kona Forest Reserve, Kauai, December 28, 1930 (Berl.; Bish.; Field).

Antidesma platyphyllum subamplexicaule var. nov.

Foliorum petioli veri breves (circ. 2 rarius usque ad 4 mm.) et crassiores; laminis glabris demum saepe conduplicatis, siccis non (vel vix sub-) nitidis, saepe 1–1.5 dm. longis et 5.5–7 cm. latis, basi rotundato cordatove plus minusve subamplexicaulibus. Fructus valde compressi, 6–12 mm. longi.

True petiolar portion of leaves short (about 2 more rarely up to 4 mm.) and thicker; blades glabrous, finally often conduplicate, when dry not (or scarcely sub-) glistening, often 1–1.5 dm. long and

5.5–7 cm. wide, more or less subamplexicaul at their rotundate or cordate base. Fruits much compressed, 6–12 mm. long.

Specimens examined: *Otto Degener* 8,138, Hali Valley, Kauai, June 11, 1926 (Deg.); *Degener* 8,139, same locality and date (Deg.; Field); *Degener* 8,140, north of Wahiawa, Kauai, June 20, 1926 (Deg.); *Degener* 10,879, in forest, same locality and date (Deg.); *Abbé Urbain Faurie* 304, alt. 1,000 meters, Waimea, Kauai, February, 1910 (Par.); *Charles N. Forbes* 118–*K*, Waioli Valley, Kauai, August 2, 1909 (Berl.; Bish.; Field); *Forbes* 509–*K*, mountains above Ka Loko Reservoir (Kilauea), Kauai, October 7, 1916 (type, Bish.).

As already remarked, Fosberg states that all the antidesmas from Kauai apparently belong to *A. platyphyllum* var. *Hillebrandii* Pax & Hoffm. The var. *subamplexicaule*, material of which seems not to have been seen by Fosberg, contrasts sharply with the type and other above cited specimens of var. *Hillebrandii* in having mature fruits with more strongly flattened stone, leaves less shiny or even dull, usually longer, much more shortly and thickly petioled, and, especially when conduplicate in age, tending at their base to clasp the branch or subtended branchlet. Regarding Fosberg's statement, it may be remarked further that at least two specimens (*Brodie* 4,032 and *St. John & Fosberg* 13,957) from Kauai appear to represent the species proper.

Antidesma pulvinatum Hillebr. Fl. Haw. Isls. 403. 1888.

Fosberg (loc. cit.) says that *A. pulvinatum* is found "in dry regions on Hawaii, Maui, and the Waianae Mountains, Oahu." It occurs also on the islands of Kauai and Molokai, as may be seen from the following list of:

Specimens examined: *Erling Christophersen* 3,673, tree, 450 meters alt., open ridge, Valley 2, below Kanehoa, central Lualualei, Waianae Mts., Oahu, June 1, 1932 (Berl.; Bish.; Del.; Field); *Christophersen* 3,679, tree 6–7 meters tall, alt. 450 meters, in forest, upper part of Valley 4, below Kanehoa, June 1, 1932 (Berl.; Bish.; Field); *Otto Degener* 8,124, in dry region, valley west of East Ohia, Molokai, July 16, 1928 (Deg.); *Degener* 8,126, in dry, rocky ravine, northwest of Puu Makaliilii, Molokai, May 22, 1928 (Deg.; Field); *Degener* 8,130, on dry talus slope, west branch of valley at pali in Waianae Valley near Kolekole Pass, Oahu, April 26, 1931 (Deg.); *Degener* 8,133, with *Bobea* in extremely arid *aa* lava waste, Ulupalakua, East Maui, June 23, 1927 (Deg.; Field); *Degener* 8,137, in arid *aa* lava *kipuka*, between Kaalualu and Waiohinu, Hawaii, September 13,

1929 (Deg.; Field); *Degener* 8,143, moderately dry, open woods, along roadside on 1926 lava flow, Hawaii, July 25, 1926 (Deg., 2 sheets); *Degener* 11,011, Kamokiuki Valley, Oahu, April 12, 1933 (Berl.; Deg.; Field); *Degener, Park, Takamoto, Bush, & Topping* 10,876, edge of decadent forest, east side of Palikea along C. C. C. trail, Oahu, March 1, 1936 (Deg.; Field); *Degener & Takamoto* 10,880, dry forest, Middle Palawai Ridge, Oahu, May 12, 1936 (Deg.; Field); *Abbé Urbain Faurie* 305, Kaala, Kauai, December, 1909 (Par.); *Charles Noyes Forbes* 369–*H*, Kapua, South Kona, Hawaii, July 26, 1911 (Berl.; Bish.; Del.; Field); *Forbes* 370–*H*, same locality and date (Berl.; Bish.; Field); *Forbes* 1,784–*M*, "Kamaio" (Kanaio?), Maui, March 1, 1920 (Bish.); *Forbes* 1,805–*M*, growing 12–15 feet tall, southwest slope of Haleakala, East Maui, March 2, 1920 (Bish.; Field); *Forbes* 1,963–*M*, Auwahi, south slope of Haleakala, March 14, 1920 (Berl.; Bish.; Del.; Field); *Forbes* 2,315–*M*, ridge at left-hand side of Olowalu Valley, West Maui, May 10, 1920 (Bish.); *Francis Raymond Fosberg* 12,345, small tree, alt. 450 meters, near bottom of wet, shaded gulch, south side of Makua Valley, Waianae Mts., Oahu, November 17, 1935 (Bish.); *Fosberg* 13,087, spreading tree 5 meters tall, alt. 550 meters, dry, wooded gully, Pohakea Pass, Halona Valley, Lualualei, Oahu, May 3, 1936 (Bish.; Field); *Fosberg & Otto Swezey* 10,932, tree 5 meters tall, alt. 550 meters, dry slope, side of gulch, almost smothered by *Lantana* and *Canavalia*, Honouliuli, Waianae Mts., Oahu, June 30, 1935 (Bish.); *V. O. Fosberg* 47*a*, tree 6 meters tall, in lantana and guava shrubbery, dry forest, beyond Hoopuloa Flow, Milolii, South Kona, Hawaii, August 10, 1936 (Bish.; Field); *William Hillebrand*, South Kona, Hawaii (Bish.); *Hillebrand*, Halawa, Oahu (Berl.); *Hillebrand*, Maui (Berl., *sub nom. A. barbigero*); *Hillebrand*, gulch back of Lahaina, West Maui, August, 1870 (Berl.); *Hillebrand & Rev. J. M. Lydgate*, Hawaiian Isls. (Bish., *cum A. platyphyllo var. hamakuaensi commixt.*); *A. F. Judd & Edward Y. Hosaka*, alt. 1,400 feet, on wooded ridge, Papaia Valley, 6th valley east of Makaleha Valley, Waianae Mts., Waialua, Oahu, December 2, 1931 (Berl.; Bish.; Field); *Noel H. Krauss*, alt. 800–1,000 feet, Piko trail, Kahanahaiki Valley, Waianae Mts., Oahu, December 30, 1933 (Bish.); *Rev. J. M. Lydgate*, West Maui (Berl.); *Joseph F. Rock* 8,650, alt. 2,000–2,600 feet, along government road, Ulupalakua, Auwahi-Kahikinui, East Maui, November, 1910 (Berl.; Bish.; Field); *Rock* 10,021, Kapua, South Kona, Hawaii, January, 1912 (Berl.; Bish.; Del.; Field; Gray); *Harold Saint-John, E. Y. Hashimoto, E. Y. Hosaka, J. C. Lindsay, & D. D. Mitchell* 11,335,

tree 25 feet tall, alt. 1,000 feet, wooded *kipuka*, Manuka Mauka, Hawaii, December 26, 1931 (Berl.; Bish.; Field); *iidem* 11,351, alt. 1,800 feet, *aa* lava, wooded *kipuka*, Manuka Mauka, December 27, 1931 (Bish.; Field).

Antidesma pulvinatum leiogonum var. nov.

Folia non venarum lateralium angulis cum mediana pulvinata sed glabra vel interdum paucisetulosa, apice saltem pauca obtusa forsitan numquam acuminata. Flores fructusque non visi.

Leaves not cushioned in the angles of the lateral veins with the median vein but glabrous or at times few-setulose, at least a few of them apically obtuse though perhaps never acuminate. Flowers and fruits not seen.

Specimens examined: *Truman G. Yuncker & Edward Yataro Hosaka* 3,214, in 4th gulch east of Puu Kaupakuhale, Waianae Mts., northwestern Oahu, October 23, 1932 (type in herb. Yuncker).

A single specimen seen, this among some specimens sent me a year or so ago by Dr. Truman G. Yuncker, Professor of Botany at De Pauw University, Greencastle, Indiana.

A NEW VARIETY OF EUPHORBIA MULTIFORMIS HOOK. & ARN.

Euphorbia multiformis mohihiensis var. nov.

Habitu *Euphorbiae multiformis* varietati *microphyllae* Boiss. similis. Capitula magna 2–4 mm. lata, glandulis perspicuis, involucro non nisi ad apicem pubescenti. Folia elliptico-oblonga vel spathulato-oblanceolata, apice non retusa. Capsulae stipes glaber.

Similar in habit to *Euphorbia multiformis* var. *microphylla* Boiss. Capitula large, 2–4 mm. wide, glands conspicuous, involucre not pubescent except at apex. Leaves elliptic-oblong or spathulate-oblanceolate, at apex not retuse. Stipe of capsule glabrous.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 3,022, on ridge east of Mohihi River, Kawaiu Trail, western Kauai, Hawaiian Isls., August 19, 1938 (type and cotype, Goth.).

SOME NEW OR OTHERWISE NOTEWORTHY LABIATAE AND COMPOSITAE

EARL EDWARD SHERFF

Since the appearance of my monographic works upon certain genera of Labiatae and Compositae (Revision of Tetramolopium, Lipochaeta, Dubautia, and Railliardia, Bishop Mus. Bull. 135. 1935; Revision of Haplostachys, Phyllostegia, and Stenogyne, Bishop Mus. Bull. 136. 1935; Revision of the genus Coreopsis, Field Mus. Bot. Ser. 11: 279–475, *figs. 1-3*, 1936; The genus Bidens, op. cit. 16. 1937), a vast amount of mostly more recently acquired herbarium material has been lent to me for study, most of it from the institutions and individuals whose aid has already been acknowledged in the preface to my paper on *Labordia*. Many of the specimens studied were found to be new to science; these are described in the following pages. Some others were important in various other respects, such as offering range extensions or throwing additional light upon the interpretation of taxonomic concepts proposed by certain other writers. So far as possible, these too receive attention. (For explanation of abbreviations used for herbaria cited, see p. 464.)

Phyllostegia mollis Skottsbergii var. nov.

Caulis subtetragonus, moderate glandulosus, dense retrorsumque hispidulus. Folia glandulosa, supra subsparsim vel secundum venas dense adpresso-hispida, infra paulo hispidiora. Inflorescentiae rami glanduloso- et patenti-hispidi, verticellastris 4- vel 6-floris; pedicellis tenuibus, patenti- et glanduloso-hispidis, plerumque 4–10 mm. longis. Calycis densissime glandulosi et moderate adpresso-hispiduli tubus 4–5 mm. longus, lobi acuti 1–2 mm. longi. Corollae extus minute adpresso-hispidulae tubus ±1.2 cm. longus, labrum superius circ. 4 mm. longum inferius ±9 mm. longum.

Stem subtetragonal, moderately glandular, densely and retrorsely hispidulous. Leaves glandular, subsparsely or along veins densely appressed-hispid above, slightly more hispid beneath. Branches of inflorescence glandular- and spreading-hispid, verticellasters 4- or 6-flowered; pedicels slender, spreading- and glandular-hispid, commonly 4–10 mm. long. Calyx densely glandular and moderately appressed-hispidulous, its tube 4–5 mm. long and acute lobes 1–2 mm. long. Corolla minutely appressed-hispidulous on outer sur-

face, its tube ±1.2 cm. long, upper lip about 4 mm. long and lower lip ±9 mm. long.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 3,039, in forest, Kalalau Trail, Kokee region, northwestern Kauai, Hawaiian Isls., August 20, 1938 (Goth.); *Gerrit Parmile Wilder* 451, erect herb, 2 feet tall, alt. 3,600 feet, in dense woods, Kokee, Isl. Kauai, March 8, 1926 (type, Field).

Some years ago, in preparing a monographic treatment of *Phyllostegia*, I concluded the Wilder plant to be new, but laid it aside, preferring to wait for additional and more ample material before drawing up a formal description. With the more recently collected material now before me, sent by Dr. Skottsberg, it becomes possible to obtain a reliable description. The two specimens match each other remarkably and leave no doubt that they represent a new variety of *Phyllostegia mollis* Benth., a species sometimes found on the Island of Kauai, but which has the leaves softly canescent beneath, the pedicels eglandular, the calyces only 3–4 mm. long, corollas smaller, etc. This variety is apparently most closely allied with *P. mollis* var. *Lydgatei* Sherff.

Stenogyne microphylla Benth. Lab. 655. 1835; DC. Prodr. 12: 556. 1848.

In my monographic study of the genus *Stenogyne* (Bull. Bish. Mus. 136: 59–101. 1935), I found no specimens of *Stenogyne microphylla* Benth. that had been collected subsequent to the year 1872 (cf. loc. cit. 98). Recently Mr. Edward Yataro Hosaka, Assistant Curator of Botany at Bernice Bishop Museum in Honolulu, found a lone plant of it as he was "going around Mauna Kea at 6,200 feet altitude." He writes: "This species seems to be very rare since I saw only one single plant the whole day." From the plant observed he obtained two specimens for my examination (they have since been deposited with Field Museum and the Natural History Museum of Paris). He describes the plant as "a freely branching vine with flowers greenish-yellow." The exact locality and date were: Hinahina [i. e., Puu Kahinahina], Humuula, North Hilo, Hawaii, April 24, 1939.

Stenogyne Cranwelliae sp. nov.

Habitu *S. Calaminthoidi* similis. Caulis elongatus, flexuosus, viridis vel atro-purpurascens, circ. 1.5–2.5 mm. crassus, acriter tetragonus, angulis retrorsum acriterque albido-setosus et plus minusve phellopterus. Folia petiolata petiolis gracilibus retrorsum

densissimeque albido-ciliatis 3–8 mm. longis; lamina rotundo-cordata vel ovato-cordata, crenato-serrata circ. 8–14 dentibus pro utroque latere, apice obtusa rotundatave, supra glabra, infra sparsissime adpresso-hispida, 1.5–2.6 cm. longa et 1.2–2.2 cm. lata. Flores 2–6 pro nodo quoque, graciliter pedicellata pedicellis glaberrimis vel rarius subpubescentibus 2–5 mm. longis; calyce subcampanulato vel obconico, extus glabro sed apice subciliato, 10- vel sub-20-nervato, tubo 3–4 mm. longo, lobis latissimis obtusissimisque ±1 mm. longis; corolla aegre curvata superne sensim dilatata sicca subpurpurea, extus praecipue supra albido-setosa, tubo ±9 mm. longo, labro superiore circ. 5 mm. longo, inferiore circ. 2–3 mm. longo.

Similar in habit to *S. Calaminthoides* A. Gray. Stem elongate, flexuous, green or dark purple, about 1.5–2.5 mm. thick, sharply tetragonal, more or less corky-winged upon the retrorsely and sharply whitish-setose angles. Leaves petiolate; petioles slender, retrorsely and very densely whitish-ciliate, 3–8 mm. long; blade rotund-cordate or ovate-cordate, crenate-serrate with about 8–14 teeth to each side, apically obtuse or rounded, glabrous above, very sparsely appressed-hispid beneath, 1.5–2.6 cm. long and 1.2–2.2 cm. wide. Flowers 2–6 to each node, delicately pedicelled with very glabrous or more rarely subpubescent pedicels, these 2–5 mm. long; calyx subcampanulate or obconic, externally glabrous but at apex subciliate, 10- or sub-20-nerved, its tube 3–4 mm. long, lobes very wide and very obtuse, ±1 mm. long; corolla weakly curved, gradually dilated upwardly, purplish when in dried state, whitish-setose outside especially above, its tube ±9 mm. long, upper lip about 5 mm. long, lower lip about 2–3 mm. long.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 3,185, on top of pali above (i. e., at head of) Waipio Valley just below first ditchman's house, Kohala, Isl. Hawaii, Hawaiian Isls., September 9, 1938 (2 type sheets, Goth.).

A species allied most closely with *S. Calaminthoides* A. Gray. From that species it differs, however, in having: leaf-petioles 3–8 not 8–12 mm. long, leaf-blades 1.5–2.6 not 2–6 cm. long and 1.2–2.2 not 1.5–4.5 cm. wide, calyx 4–5 not 8–12 mm. long, corolla about 1.4 not 2.5–4 cm. long, its lower lip a half shorter than and not subequal to the upper, etc. It is a pleasure to name this interesting species after one of its collectors (Miss Lucy May Cranwell, M. A., Curator, Department of Botany, Auckland Institute and Museum, Auckland, New Zealand).

Lipochaeta dubia Degener & Sherff, sp. nov.

Frutex decumbens, ramosus, ramis tenuibus ±1 mm. crassis angulatis sparsim vel moderate adpresso- et antrorso-setosis. Folia petiolata petiolis gracilibus antrorsum hispidis usque ad ±1.5 cm. longis, petiolo adjecto usque ad ±4.5 cm. longa; lamina plerumque tripartita, segmento terminale elongato lineari-oblongo vel lineari-oblanceolato apice acuto marginaliter denticulato, segmentis lateralibus brevibus saepe plus minusve bipartitis, omnibus superne viridibus moderate adpresseque antrorso-hispidis inferne pallidis dense adpresseque antrorso-hispidis, venis infra moderate elevatis. Capitula graciliter pedunculata pedunculis saepius 3–5 cm. longis, ligulata, pansa ad anthesin 1.5–2.5 cm. lata et circ. 6 mm. alta. Involucri bracteae oblongae, apice acutae, dense adpresseque antrorso-hispidae, 3–5 mm. longae. Flores ligulati 6–8, flavi, ligula lineari-oblongi, 7–11 mm. longi, apice subintegri vel obtuse bidenticulati. Achaenia obovata, plerumque triquetra angulis alata alis laceratis apice in spinulam incurvatam productis, corpore circ. 2 mm. longa, apice centraliter circ. 4-aristata aristis subrectis validis flavidis saepius 1–1.5 mm. longis.

Decumbent shrub, branched; branches slender, ±1 mm. thick, angled, sparsely or moderately appressed- and antrorse-setose. Leaves petiolate, up to ±4.5 cm. long including the slender and forwardly hispid petiole (this up to ±1.5 cm. long); blade commonly tripartite, terminal segment elongate, linear-oblong or linear-oblanceolate, at apex acute, at margin denticulate, lateral segments short and often more or less bipartite, all segments moderately and appressedly antrorse-hispid on their green upper surface and densely and appressedly antrorse-hispid on their pale lower surface, the veins moderately salient beneath. Heads slenderly peduncled, ligulate, 1.5–2.5 cm. wide and about 6 mm. tall when expanded at anthesis; peduncles more often 3–5 cm. long. Involucral bracts oblong, at apex acute, densely and appressedly antrorse-hispid, 3–5 mm. long. Ligulate florets 6–8, yellow, 7–11 mm. long, at apex subentire or obtusely bidenticulate, ligule linear-oblong. Achenes obovate, commonly triquetrous and winged at angles (wings lacerate and at apex produced into a small, incurved spine), about 2 mm. long as to body proper, at center of apex about 4-aristate; aristae slightly bent, stout, yellowish, more often 1–1.5 mm. long.

Specimens examined: *Otto Degener, Emilio Ordoñez, & J. Foster* 12,285, among lantanas and grasses, northeast slope of Puu Hapapa, Oahu, April 2, 1939 (Berl.; Deg.; Field); *iidem* 12,287, within 100

feet of no. 12,285, same date (Berl.; Deg.; Field); *iidem* 12,290, within 100 feet of nos. 12,285 and 12,287, same date (Berl.; Deg.; Field); *iidem* 12,331, among thick, dry grasses, within 100 feet of nos. 12,285, 12,287, and 12,290, May 7, 1939 (type, Field).

Lipochaeta lavarum (Gaud.) DC. Prodr. 5: 611. 1836.

In my revision of the genus *Lipochaeta* DC. (Bernice P. Bishop Mus. Bull. 135: 23–83. 1935), I referred all material of *L. lavarum* either to the species proper or to its variety *longifolia*. Subsequent study has shown that *L. lavarum* proper is apparently absent from Lanai, but that, in addition to the broad-leaved var. *longifolia*, of Maunalei Valley, there are four fairly well marked narrow-leaved varieties on that island. These differ at once from *L. lavarum* proper by their narrower leaves, which have much less salient and much less reticulate venation, also by the presence commonly of only one instead of three lengthwise veins. They are described below and may be severally distinguished according to the following key:

a. Leaves mostly serrate; achenes not fimbriately bordered at top. var. *maneleana*.

a. Leaves mostly entire or obscurely denticulate; achenes fimbriately bordered at top.

b. Flowering heads ±1.3 cm. wide..... var. *Stearnsii*.

b. Flowering heads 2–3.5 cm. wide.

c. Secondary leaves rather numerous and clustered, mostly attenuate-linear..... var. *conferta*.

c. Secondary leaves few and remote, mostly oblong-linear or spatulate-linear..... var. *lanaiensis*.

Lipochaeta lavarum Stearnsii Degener & Sherff, var. nov.

Folia spathulate linearia, subintegra, inferne in petiolum tenuem usque ad ±7 mm. longum sensim attenuata, apice obtusa vel plus minusve acuta, subtenuia, utrinque canescentia, longitudinaliter 1-nervia, arcuate penninervia, primaria perpauca visa petiolo adjecto ±6 cm. longa et 5–7 mm. lata, secundaria (subnumerosa) 2–4 cm. longa et 3–5 mm. lata. Capitula minora pansa ad anthesin ±1.3 cm. lata et circ. 4.5 mm. alta, disco demum circ. 9 mm. lato et circ. 6 mm. alto. Involucri bracteae exteriores ovatae subacutae 2.5–3.5 mm. longae. Flores ligulati tantum circ. 6–7 mm. longi. Achaenia fimbriato-coronata et plerumque aristata.

Leaves spatulately linear, subentire, gradually narrowed below into a slender petiole ±7 mm. long, apically obtuse or more or less

acute, somewhat thin, on both surfaces canescent, lengthwise 1-nerved, arcuately penninerved, primary ones (only a very few seen) ±6 cm. long including petiole and 5–7 mm. wide, the subnumerous secondary ones 2–4 cm. long and 3–5 mm. wide. Capitula smaller, about 4.5 mm. tall and ±1.3 cm. wide when expanded at anthesis, disc finally about 9 mm. wide and about 6 mm. tall. Exterior involucral bracts ovate, subacute, 2.5–3.5 mm. long. Ligulate florets only about 6–7 mm. long. Achenes fimbriately crowned and commonly aristate.

Specimens examined: *Harold Stearns* (*Otto Degener's* distrib. no.) 11,050, alt. 800 feet, Kapoho Canyon, Isl. Lanai, Hawaiian Isls., June, 1936 (type, Field).

Lipochaeta lavarum lanaiensis var. nov.

Rami elongati subsimplicesque, internodiis saepe 5–10 cm. longis. Folia plerumque oblongo-linearia vel spathulato-linearia, subintegra, inferne in petiolum tenuem usque ad 1.5 cm. longum sensim attenuata, longitudinaliter 1-nervia, moderate penninervia, apice subobtusa, utrinque canescentia, petiolo adjecto 2–4 cm. longa et 4–7 mm. lata. Capitula pansa ad anthesin 2–3.5 cm. lata et circ. 5 mm. alta, disco demum ±8 mm. lato et ±4 mm. alto. Involucri bracteae ovatae subacutae vel acutae, ±3 mm. longae. Achaenia fimbriato-coronata et plerumque aristata.

Branches elongate and subsimple, internodes often 5–10 cm. long. Leaves commonly oblong-linear or spatulate-linear, subentire, gradually narrowed below into a slender petiole up to 1.5 cm. long, lengthwise 1-nerved, moderately penninerved, at apex subobtuse, on both surfaces canescent, 2–4 cm. long including petiole and 4–7 mm. wide. Capitula 2–3.5 cm. wide when expanded at anthesis and about 5 mm. tall, disc finally ±8 mm. wide and ±4 mm. tall. Involucral bracts ovate, subacute or acute, ±3 mm. long. Achenes fimbriate-crowned and commonly aristate.

Specimens examined: *Charles Noyes Forbes* 507–*L*, Maunalei Gulch, Isl. Lanai, Hawaiian Isls., September, 1917 (3 type sheets, Field).

Lipochaeta lavarum conferta var. nov.

Plus minusve ramosa, foliis ad ramulorum bases congregatis, linearibus, utrinque attenuatis, margine subintegris integrisve, utrinque canescentibus, petiolo tenui 3–9 mm. longo adjecto secundariis subnumerosis 3–5 cm. longis et 4–7 mm. latis. Capitula pansa ad anthesin 2–3.5 cm. lata et 7–8 mm. alta. Achaenia fimbriato-coronata et plerumque aristata.

More or less branched; leaves congregated at bases of branchlets, linear, at both ends attenuate, subentire or entire, on both surfaces canescent, the subnumerous secondary ones 3–5 cm. long including the slender petiole (this 3–9 mm. long) and 4–7 mm. wide. Capitula 2–3.5 cm. wide when expanded at anthesis and 7–8 mm. tall. Achenes fimbriate-crowned and commonly aristate.

Specimens examined: *Horace Mann & William T. Brigham* 358, Isl. Lanai, Hawaiian Isls. (type, Field).

Lipochaeta lavarum maneleana var. nov.

Caules simplices ramosive, internodiis saepius elongatis; foliis primariis oblonge oblanceolatis, apice saepius subobtusis, basi in petiolum tenuem 0.5–2 cm. longum cuneate sensimque angustatis, margine serrulatis, utrinque canescentibus, longitudinaliter 1-nerviis, penninerviis, petiolo adjecto 5–6.5 cm. longis et 7–9 mm. latis. Capitula pansa ad anthesin sub 2 cm. lata et ±5 mm. alta. Achaenia apice pulverulento centraliter plerumque aristata sed ad circuitum saepius 1–7-appendiculata.

Stems simple or branched, internodes more often elongate; primary leaves oblong-oblanceolate, at apex more often subobtuse, at base gradually and cuneately narrowed into a slender petiole 0.5–2 cm. long, at margin serrulate, on both surfaces canescent, lengthwise 1-nerved, penninerved, 5–6.5 cm. long including petiole and 7–9 mm. wide. Capitula under 2 cm. wide when expanded at anthesis and ±5 mm. tall. Achenes commonly aristate at center of the pulverulent apex but more often only 1–7-appendiculate at its circumference.

Specimens examined: *Charles Noyes Forbes* 288–*L*, on slopes above Manele, Isl. Lanai, Hawaiian Isls., June, 1913 (2 type sheets, Field).

The type material somewhat resembles in general habit the typical *L. lavarum* of Maui and elsewhere and had been considered by me some years ago as connecting the bulk of Lanai material with the species proper. A re-examination shows, however, that it differs at once in the absence of two well developed lateral leaf-veins (which if present would give the characteristic triple-nerved leaves so common in *L. lavarum* proper) and in its lack of a definite fimbriate coronula near the centers of the achenial apices. It is likely, too, that the flowering heads are consistently smaller. In the species proper, they measure 1.8–2.6 (rarely –3) cm. across, while here the three examined are well under 2 cm. across.

Bidens somaliensis Sherff, Bot. Gaz. 90: 395. 1930; Field Mus. Bot. Ser. 16: 595, *pl. 167*. 1937.

The type of *Bidens somaliensis* was collected by *Domenico Riva*, no. 85, in grassy fields and on plains, from Biddum to Volghe, Somalia, September 15, 1893 (Flor., 2 sheets). This heretofore little-known species has recently been collected again by Miss G. A. Chambers, in the rather remote Bukoba Province of northwestern Tanganyika Territory: no. *K*52, "largely growing in country which reminded me of Alpine meadows," alt. 6,000 feet, Bugufi, January, 1936 (Kew); no. *K*55, with identical data. Like the two type specimens, these differ from the somewhat similar *Bidens ruandensis* Sherff of the region (Ruanda) immediately west of Bukoba, in having the upper leaves lanceolate or broader (not linear), foliar teeth antrorse or spreading (not incurved), exterior involucral bracts equaling or shorter than (not longer than) the interior, etc. (It may be noted here that the leaves of *B. somaliensis* were originally described somewhat misleadingly as "non manifeste petiolata," with the qualification that they were "inferne sensim ad basim . . . angustata." In the case of the lower and even some median leaves, the cuneately narrowed basal portion of the *lamina* ends in what amounts to an alate-margined petiole 1–4 cm. long.)

Collected by Miss Chambers at the same place and time with her *K*52 and *K*55 was a third specimen, no. *K*21 (Kew). This was from a robust plant probably a meter or more tall, and erectly well branched at the subcorymbose, 9-capitulate inflorescence. The uppermost leaves, to be sure, are essentially linear, as for *B. ruandensis*, but the characters of the median leaves reveal a closer affinity with *B. somaliensis*, of which Miss Chambers' plant (*K*21) may be taken as representing a new variety:

Bidens somaliensis bukobensis var. nov.

Folia mediana angustiora, sub 1.8 cm. lata, utrinque attenuata sed apice subobtusa, utroque latere irregulariter tantum 1–3-dentata vel superiora integra. Achaenia breviora, sub 1 mm. longa.

Median leaves narrower, under 1.8 cm. wide, at both ends attenuate but subobtuse at apex, on each side irregularly only 1–3-dentate or the upper ones entire. Achenes shorter, under 1 mm. long.

Bidens Steppia var. **Elskensii** Sherff, Bull. Jard. Bot. Brux. 13: 286. 1935; Field Mus. Bot. Ser. 16: 545. 1937.

The type of this variety was collected by O. Elskens, no. 257, in places long cultivated, hills at Kitega, Ruanda, tropical east Africa,

December 13, 1922 (Bruss.). Its achenes measured 1.1–1.3 mm. wide. Recently the variety has been collected once again, in a region not far east of Ruanda: *Romola D. Bax* 204, near Shinyanga, northern Tanganyika Territory, 1932–1933 (Kew).[1] This latter specimen, consisting of three fine flowering and fruiting sprays mounted on a single sheet, is close to the type (of which I have my large photograph before me) but differs in having somewhat narrower achenes, these measuring only 0.8–1 mm. wide.

Bidens Schimperi brachycera var. nov.

Herba annua ±4.5 dm. alta. Folia principalia 5- vel 7-partita petiolo usque ad 4.5 cm. longo, petiolo adjecto majora ±1.8 dm. longa, foliolis moderate vel sublate lanceolatis, imis interdum breviter (2–5 mm.) petiolulatis usque ad 7 cm. longis et 4 cm. latis plus minusve 3–5-partitis (lobis lateralibus parvis ovatis ±1 cm. longis). Capitula pansa ad anthesin 2–4.5 cm. lata, involucri bracteis exterioribus usque ad 2 cm. longis et 2.8 mm. latis, floribus ligulatis etiam usque ad 2.3 cm. longis. Achaenia minora tantum circ. 5–6 mm. longa et supra 1–1.3 mm. lata, inferne sensim plus minusve angustata; aristis minimis sub 0.2 mm. longis, nudis.

Annual herb ±4.5 dm. tall. Principal leaves 5- or 7-parted, with petiole included (this up to 4.5 cm. long) the larger ones ±1.8 dm. long; leaflets moderately or rather widely lanceolate, lowermost ones sometimes shortly (2–5 mm.) petiolulate up to 7 cm. long and 4 cm. wide and more or less 3–5-parted (their lateral lobes small, ovate, ±1 cm. long). Capitula 2–4.5 cm. wide when expanded at anthesis; exterior involucral bracts up to 2 cm. long and 2.8 mm. wide; ligulate florets even up to 2.3 cm. long. Achenes smaller, only about 5–6 mm. long and near top 1–1.3 mm. wide, gradually more or less narrowed downwardly; aristae very small, under 0.2 mm. long, nude.

Specimens examined: *Romola D. Bax* 203, growing 2–3.5 feet tall, in long grass, Shinyanga, northern Tanganyika Territory, March, 1933 (Kew); *Bax* 206, growing 1.5 feet tall, in grass, Shinyanga, May, 1933 (type, Kew).

Bidens Schimperi Schz. Bip., as might be surmised from the several synonyms which have been created for it, is a polymorphous species, especially so as to leaf-outline and size of achenes. The species proper normally has the outer achenes with bodies ranging

[1] Shinyanga is about 100 kilometers south of the southeast coast of Lake Victoria. *Bax* 203 (Kew) was collected in March, 1933, and *Bax* 206 (Kew) in May, 1933, but the month is not given for *Bax* 204.

up to 9–12 (–14) mm. long and 2–2.6 mm. wide, and inner achenes with bodies up to 1.6 cm. long and about 2 mm. wide. Cultivated specimens sometimes have inner achenes with bodies 2.2 cm. long. Var. *leptocera* Sherff differs as to achenes in having the bodies only 3–5 mm. long, also the aristae exceedingly slender and 1.5–3 (not 2.5–4) mm. long. Var. *brachycera* differs at once from both in having achenes almost exaristate, the aristae being mere rudiments less than 0.2 mm. long and without barbs. From var. *leptocera*, var. *brachycera* may be recognized instantly by its moderately to almost broadly lanceolate, not linear to linear-lanceolate, leaf-divisions.

Bidens Schimperi leiocera var. nov.

Folia bipinnata vel tripinnatisecta, petiolo gracili usque ad 5 cm. longo, rhachi exalata vel terminaliter subalata, petiolo adjecto ±1.5 dm. longa. Capitula pansa ad anthesin 3–4 cm. lata, disco circ. 1.2 cm. lata. Ovaria faciebus marginibusque glabra apice fimbriato-setoso biaristata aristis tenuibus acribus nudis ±2.5 mm. longis.

Leaves bipinnate or tripinnatisect, including the slender (and up to 5 cm. long) petiole ±1.5 dm. long, rachis exalate or terminally subalate. Capitula 3–4 cm. wide when expanded at anthesis, disc about 1.2 cm. wide. Ovaries glabrous on faces and margins, at top fimbriate-setose and biaristate; aristae slender, sharp, nude, ±2.5 mm. long.

Specimens examined: *J. D. Martin*, Mazabuka, northern Rhodesia (type, Kew).

The type had been determined at Kew as *Coreopsis Steppia* Steetz (*Bidens Steppia* mihi), perhaps because of the rather long ray-florets, these giving the flowering heads a width of 3–4 cm. In characters of the leaves (nature of pubescence, texture, presence of numerous glandular dots, kind of dissection, outlines of segments, etc.), in nature of involucre, in size of disc, etc., the affinities are seen at once to be with *Bidens Schimperi* Schz. Bip.

Bidens Snowdenii sp. nov.

Herba annua, ±5 dm. alta; caule tetragono, purpurascenti, glabro, superne ramoso, ramis sparsim hispidis. Folia primaria absentia; secundaria tenuiter petiolata petiolis ciliatis aliter saepe glabratis 5–13 mm. longis, petiolo adjecto sub 3.5 cm. longa et sub 2 cm. lata, pinnatim 3–5-partita segmentis plus minusve rhomboide ovatis lanceolatisve acriter saepe subincise paucidentatis membranaceis hispidis plus minusve petiolulatis saepius 5–12 mm. longis. Capitula moderate numerosa (±25), subcorymbose disposita, radi-

ata, pansa ad anthesin 2–2.5 cm. lata et 7–8 mm. alta, graciliter pedunculata pedunculis sparsim hispidis usque ad 5.5 cm. longis, disco demum circ. 1.2 cm. lato. Involucri bracteae 2-seriales subaequales, exteriores 8–10 lineari-lanceolatae hispidae apice saepius acutae demum reflexae 5–6 mm. longae et 1–1.4 mm. latae; interiores late oblongo-lanceolatae, plus minusve glabratae. Flores ligulati 8–10, flavi, ligula lineari-oblongi, ±1 cm. longi. Paleae lanceolatae vel oblongae, infra saepe late diaphano-marginatae, sub 8 mm. longae. Achaenia anguste vel late oblongo-linearia vel interdum subcuneata, exalata, facie ventrali plana dorsali angulato-convexa, utraque facie circ. 8-sulculata et superne erecto-setosa, plumbeo-nigra, marginibus infra breviter supra longius erecto-setosa, apice erecte setosa setis in cristam coronamve membranaceam coalitis etiam biaristata aristis gracilibus 1–2.2 mm. longis antrorsum hispidulis.

Annual herb, ±5 dm. tall; stem tetragonal, becoming purplish, glabrous, branched above, the branches sparsely hispid. Primary leaves absent; secondary ones slenderly petiolate (the ciliate but otherwise often glabrate petioles 5–13 mm. long), under 3.5 cm. long with petiole included and under 2 cm. wide, pinnately 3–5-parted; segments more or less rhomboidally ovate or lanceolate, sharply often incisedly few-dentate, membranaceous, hispid, more or less petiolulate, more often 5–12 mm. long. Capitula moderately numerous (±25), subcorymbosely disposed, radiate, 2–2.5 cm. wide when expanded at anthesis and 7–8 mm.tall, slenderly pedunculate with the sparsely hispid peduncles up to 5.5 cm. long, disc finally about 1.2 cm. wide. Involucral bracts 2-seriate, subequal; exterior ones 8–10, linear-lanceolate, hispid, at apex more often acute, finally reflexed, 5–6 mm. long and 1–1.4 mm. wide; interior ones widely oblong-lanceolate, more or less glabrate. Ligulate florets 8–10, yellow, ±1 cm. long, the ligule linear-oblong. Paleae lanceolate or oblong, often widely diaphanous-margined below, under 8 mm. long. Achenes narrowly or widely oblong-linear or sometimes subcuneate, exalate, ventrally flat but dorsally angulate-convex, on each face about 8-sulculate and toward top erectly setose, leaden-black, at margins shortly erect-setose below but more elongately so above, at apex erect-setose with setae coalesced into a membranaceous crest or crown, also biaristate; aristae slender, 1–2.2 mm. long, antrorsely hispidulous.

Specimens examined: *J. D. Snowden* 1,631, growing 1–2 feet tall, occasional in short-grass land, alt. 7,000 feet, "Kigezi: Mabungo," Uganda, Kenya Colony, October 25, 1929 (type, Kew).

In the key given in my monograph on *Bidens* (Field Mus. Bot. Ser. 16. 1937), *B. Snowdenii* goes to the first letter *e* on page 62. As to length of ligulate florets, it goes to the first letter *f* thereunder, but may be separated at once from the two species there given by its antrorsely hispidulous not, as in *B. Schimperi*, retrorsely barbed achenial aristae, or by the even or unbroken not (as in *B. Onisciformis*) pectinate-dentate or lacerate margins of the exterior achenes. From the nature of its achenes, with their apical setae somewhat coalesced below into a small, diaphanous cup or crown, *B. Snowdenii* is seen to stand near *B. Grantii* (Oliv.) Sherff.

Bidens imatongensis sp. nov.

Herba perennis, ramosa, valida, usque ad 2.4 m. alta; ramis sulcatis subangulatis sparsim vel apices versus dense hispidis. Folia opposita, breviter alato-petiolata, pinnatim ±5-partita (unicum principale paulum mancum visum); foliolis lateralibus inferioribus lanceolato-ovatis, petiolulatis petiolulo late alato ±1 cm. longo, grosse acriterque dentatis (dentibus saepe duplicibus triplicibusve subantrorsis apice calloso-mucronulatis), apice attenuatis, membranaceis, supra subsparsim infra moderate vel ad venas dense pilis multiloculatis hispidis, usque ad 9.5 cm. longis et 5 cm. latis; lateralibus superioribus similibus sed paulo minoribus et basi sessili ad rhachin late decurrentibus; terminali angustiore. Capitula ±4-congregata, subrobuste pedunculata pedunculo dense patenti-hispido 1–7 cm. longo, radiata, pansa ad anthesin ±5 cm. lata et ±1.5 cm. alta, disco demum 2–2.5 cm. lato et circ. 1.5 cm. alto. Involucri hispidi bracteae 2- vel sub-3-seriales lanceolatae extimae circ. 10–12 patentes reflexaeve 8–15 mm. longae quam aliae paulo nunc breviores nunc longiores. Flores ligulati ±12, flavi, ligula anguste oblongo-obovati, apice plus minusve integri ±2.5 cm. longi. Paleae oblonge lineares, apice colorato subacutae vel acutae, usque ad 1.4 cm. longae. Achaenia submatura plana, cuneate angusteque linearioblonga, atro-brunnea, utraque facie circ. 8-sulculata et glabra vel supra sparsissime setosa, apice marginibusque erecte setosa, corpore 4–6 mm. longa et 1.1–1.4 mm. lata, exalata, biaristata aristis gracilibus acribus ±2 mm. longis maxima pro parte nudis sed plerumque ad basim raro ad apicem antrorso-setosis.

Perennial herb, branched, robust, up to 2.4 meters tall; branches grooved, subangulate, sparsely or toward their tips densely hispid. Leaves opposite, shortly wing-petioled, pinnately ±5-parted (a lone, somewhat imperfect principal leaf seen); lower lateral leaflets lanceolate-ovate, petiolulate with a widely winged petiolule ±1 cm. long,

coarsely and sharply dentate (teeth often double or triple, subantrorse, apically indurate-mucronulate), at apex attenuate, membranaceous, above subsparsely below moderately or at the veins densely hispid with multiloculate hairs, up to 9.5 cm. long and 5 cm. wide; upper lateral leaflets similar but somewhat smaller and at their sessile base widely decurrent upon the rachis; terminal leaflet narrower. Capitula ±4 to an inflorescence, subrobustly pedunculate with a peduncle densely spreading-hispid and 1–7 cm. long, radiate, ±5 cm. wide when expanded at anthesis and ±1.5 cm. tall, disc finally 2–2.5 cm. wide and about 1.5 cm. tall. Involucre hispid, its bracts 2- or sub-3-seriate and lanceolate; outermost ones about 10–12, spreading or reflexed, 8–15 mm. long; the others now a little longer now a little shorter. Ligulate florets ±12, yellow, with narrowly oblong-obovate ligule, at apex more or less entire, ±2.5 cm. long. Paleae oblong-linear, subacute or acute at the colored apex, up to 1.4 cm. long. Achenes submature, flat, cuneately and narrowly linear-oblong, blackish-brown, on each face about 8-sulculate and glabrous or toward top very sparsely setose, at apex and margins erectly setose, exalate, as to body 4–6 mm. long and 1.1–1.4 mm. wide, biaristate; aristae slender, sharp, ±2 mm. long, for the most part nude but commonly at base and rarely at apex antrorsely setose.

Specimens examined: *W. J. Eggeling* 1,195 (field no. 820), large, branched herb, growing up to 8 feet tall, alt. 6,500 feet, Imatong Mountains, Uganda, Kenya Colony (type, Kew).

In the key given in my monograph on *Bidens* (Field Mus. Bot. Ser. 16. 1937), *B. imatongensis* might go at times to *B. magnifolia* (first letter *i* on page 69) but doubtless more often would go to near *B. Crataegifolia* and *B. kamerunensis* (both under the second letter *n* on page 70). From *B. magnifolia* it differs in having short, winged leaf-petioles; not or at most very inconspicuously glandular-punctulate leaf-blades; peduncles spreading-hispid, not glabrate; mostly larger, more spreading, more or less 3-seriate involucral bracts; about 12 not 8–10 ligulate florets, etc. From *B. Crataegifolia* it differs in having shorter leaf-petioles (±1 not 2–3 cm. long); leaf-blades pinnately ±5-parted, the larger ones ±2 dm. wide, not simple or subsimple and 2.5–3.5 cm. wide; ligulate florets about 12, not about 8; achenial aristae slender and ±2 mm. long, not thickish below and about 0.5 mm. long, etc. From *B. kamerunensis* it differs in having lateral leaflets of larger leaves up to 9.5 cm. long and 5 cm. wide, not up to 2.5 cm. long and about 1 cm. wide; achenial body (when mature) probably little more than 6 mm. long and 1.4 mm.

wide, not about 11–13 mm. long and 2 mm. wide; achenial apex consistently biaristate with slender aristae mostly about 2 mm. long, not exaristate or at most comparatively short-aristate with aristae under 1.5 mm. long, etc.

Bidens Lynesii sp. nov.

Perennis, fruticosa vel subfruticosa, ramosa, usque ad 2.7 m. alta; ramis tetragonis, glabris, siccis purpureo-nigris; ultimis gracilibus, saepius 0.7–2 mm. crassis, superne plus minusve hispidulis. Folia opposita, petiolata petiolis tenuibus patenti-hispidis usque ad ±3.5 cm. longis, petiolo adjecto 6–11 cm. longa, pinnatim 3–5-partita, demum insigniter membranacea, supra non nisi secundum venas hispidula, infra pallidiora saepe numerose atro-punctulata et praecipue secundum venas hispida pilis multiloculatis; foliolis ovatis vel terminali lanceolato, acriter subdupliciterque serratis (dentibus mucronatis), lateralibus obtusis acutisve usque ad 2.5 cm. longis et 1.5 cm. latis, rhachi alata, terminali acuto attenuatove. Capitula solitaria vel pauca ad ramulorum apices disposita, radiata, pansa ad anthesin 3.5–4.5 cm. lata et ±1 cm. alta; pedunculo gracili usque ad 5.5 cm. longo. Involucri bracteae biseriales, exteriores circ. 8, oblongo-spathulatae vel obovato-oblongae, irregulariter hispidae pilis multiloculatis, circ. 5-nervatae, apice acutae vel subobtusae, circ. 6–7 mm. longae; interiores paulo longiores, moderate hispidulae, ovato-lanceolatae. Flores ligulati circ. 8, flavi, ligula anguste oblanceolato-oblongae, apice subintegri, 1.6–2.2 cm. longae. Paleae lineari-oblongae, 6–7 mm. longae. Achaenia submatura valde obcompressa, anguste oblonga, nigra, utraque facie ±8-sulculata et glabra vel apicem versus paucisetosa, exalata sed apice marginibusque erecto-setosa setis stramineis et inferne plus minusve alato-connatis, corpore ±4.5 mm. longa et ±1.4 mm. lata, biaristata aristis tenuissimis acribus circ. 3.5–4 mm. longis nudis vel raro antrorso-hamosa unico hamo.

Perennial, fruticose or suffruticose, branched, up to 2.7 meters tall; branches tetragonal, glabrous, purplish-black when dry; ultimate branches slender, more often 0.7–2 mm. thick, more or less hispidulous above. Leaves opposite, petiolate, 6–11 cm. long including petiole, pinnately 3–5-parted, finally very membranaceous, glabrous on upper surface unless hispidulous along veins, on paler lower surface often numerously dark-punctulate and especially along veins hispid with multilocular hairs; leaflets ovate or terminal one lanceolate, sharply and somewhat doubly serrate with mucronately tipped teeth, lateral ones obtuse or acute and up to 2.5 cm. long by

1.5 cm. wide, rachis winged, terminal leaflet acute or attenuate at apex; petiole slender, spreading-hispid, up to ±3.5 cm. long. Capitula solitary or few at the ends of the branches, radiate, 3.5–4.5 cm. wide when expanded at anthesis and ±1 cm. tall; peduncle slender, up to 5.5 cm. long. Involucral bracts in two series; exterior about 8, oblong-spatulate or obovate-oblong, irregularly hispid with multilocular hairs, about 5-nerved, at apex acute or subobtuse, about 6–7 mm. long; interior a little longer, moderately hispidulous, ovate-lanceolate. Ligulate florets about 8, yellow, with narrowly oblanceolate-oblong ligule, at apex subentire, 1.6–2.2 cm. long. Paleae linear-oblong, 6–7 mm. long. Achenes submature, strongly obcompressed, narrowly oblong, black, on each face ±8-sulculate and glabrous or toward apex few-setose, exalate but at margins and apex erect-setose with straw-colored and infernally more or less alate-connate setae, as to body ±4.5 mm. long and ±1.4 mm. wide, biaristate; aristae very slender, sharp, about 3.5–4 mm. long, naked or rarely antrorse-barbed with a single barb.

Specimens examined: *Rear-Admiral Hubert Lynes* (Dabaga no.) 4, growing into a bush up to 9 feet tall at edges of groves, Dabaga, Tanganyika Territory, February 5, 1932 (type, Kew).

The aspect of the four sprays mounted upon the type sheet is singularly like that of many Hawaiian Island species of the section *Campylotheca* (Cass.) Nutt. The species is seen from its achenes, however, to belong, as all other forms of *Bidens* newly described in this paper, in the section *Psilocarpaea* DC. In the key given in my monograph on *Bidens* (Field Mus. Bot. Ser. 16. 1937), *B. Lynesii* would go very definitely to the first letter *m* on page 70. From *B. phelloptera* given there it differs widely, however, in having its exterior involucral bracts hispid and upwardly dilated, its interior involucral bracts not connate below, its mature inner achenial bodies surely never 8–9 mm. long, etc.

Bidens insignis sp. nov.

Herba perennis, ±1.5 m. alta; caulibus pluribus congregatis, forsitan non ramosis, tetragonis, glabris, sulculatis et plus minusve purpureo-striatis. Folia opposita, petiolata, supra moderate infra dense hispida; inferiora vel principalia magna, petiolis circ. 4.5–5 cm. longis, lamina circumambitu deltoideo-ovata ±11 cm. longa et 9–14.5 cm. lata rhachi plus minusve alata foliolis lateralibus 3 vel 4 paribus (ovato-lanceolatis, 2.5–7.5 cm. longis et 1.5–3 cm. latis, apice acutis vel attenuatis, crenato-serratis et saepe incise 1–3-lobulatis, secundum

rhachin decurrentibus) terminali (pro unico folio viso et forsitan non typico) breviore rhomboideo utrinque latissime cuneato; superiora minora, petiolis 2–3.5 cm. longis, lamina 6–7 cm. longa et ±7 cm. lata, foliolis lateralibus 1 pare lanceolatis vel ovato-lanceolatis simplicibus terminali rhomboideo subtripartito segmentis plus minusve attenuatis. Capitula corymbose disposita, radiata, pansa ad anthesin ±8 cm. lata et ±1.3 cm. alta, disco 1.5–2 cm. lato, pedicellis ±1 cm. longis et (ut inflorescentiae ramis) patenti-hispidis. Involucri bracteae hispidae 2–3-seriales exteriores 8–10 lineares vel lanceolatae 6–8 mm. longae interiores lanceolatae ±1 cm. longae. Flores ligulati probabiliter 12–14, flavi, ligula oblongi vel obovato-oblongi, apice vix denticulati, 3–4 cm. longi et usque ad 1.1 cm. lati. Paleae lineares, 7–10 mm. longae. Achaenia submatura plana, exalata, utraque facie circ. 8-sulculata et glabra vel paulum erecto-hispidula, brunneo-atra, marginibus apiceque erecto-setosa, biaristata aristis 1.5–2.5 mm. longis nudis vel raro basin versus antrorsum 1-hamosis.

Perennial herb, ±1.5 meters tall; stems clumped many together, possibly simple, tetragonal, glabrous, sulculate and more or less purple-striate. Leaves opposite, petiolate, above moderately below densely hispid; lower or principal ones large, petioles about 4.5–5 cm. long, blade deltoid-ovate in outline and ±11 cm. long by 9–14.5 cm. wide, rachis more or less alate, lateral leaflets 3 or 4 pairs (ovate-lanceolate, 2.5–7.5 cm. long and 1.5–3 cm. wide, at apex acute or attenuate, crenate-serrate and often incisedly 1–3-lobulate, decurrent along the rachis), terminal leaflet (this seen for a single leaf and perhaps not typical) shorter, rhomboid, at both ends very widely cuneate; upper leaves smaller, petioles 2–3.5 cm. long, blade 6–7 cm. long and ±7 cm. wide, lateral leaflets a single pair (these lanceolate or ovate-lanceolate, simple), terminal leaflet rhomboid, subtripartite, its segments more or less attenuate. Capitula corymbosely disposed, radiate, ±8 cm. wide when expanded at anthesis and ±1.3 cm. tall, disc 1.5–2 cm. wide, pedicels ±1 cm. long and (like branches of inflorescence) spreading-hispid. Involucral bracts hispid, 2–3-seriate, the 8–10 outer ones linear or lanceolate and 6–8 mm. long, inner ones lanceolate and ±1 cm. long. Ligulate florets probably 12–14, yellow, with oblong or obovate-oblong ligule, at apex scarcely denticulate, 3–4 cm. long and up to 1.1 cm. wide. Paleae linear, 7–10 mm. long. Achenes submature, flat, exalate, on each face about 8-sulculate and glabrous or somewhat erect-hispidulous, brownish-black, at margins and top erect-setose, biaristae; aristae 1.5–2.5 mm. long, naked or rarely armed toward base with an erect barb.

Specimens examined: *Mrs. Brodhurst-Hill* 612, a very handsome plant, growing in large clumps, 5 feet tall, alt. about 7,000 feet, Menengai, Kenya Colony (type, Kew).

Rather noteworthy as combining in one species such large lower leaves, glabrous and purple-striate stems, comparatively small exterior involucral bracts, and large flowering-heads. In the key given in my monograph on *Bidens* (Field Mus. Bot. Ser. 16. 1937), *B. insignis* would stand next to *B. magnifolia* on page 69. From that species it differs at once in having only the lower leaves large (these even then being less attenuate-tipped, rather thickish, less sharply serrate, and lacking blackish, glandular dots), peduncles or pedicels much shorter, flowering heads broader, ligulate florets longer and more numerous, achenial aristae nude, etc.

In its lower or larger leaves it may faintly approach the upper leaves of *Coreopsis pinnatipartita* O. Hoffm., from which it differs in lacking glabrous, alate, exaristate achenes, etc.

Bidens nobilis sp. nov.

Frutex ramosus 1.8–3.6 m. altus, ramis tetragonis sulculatis demum atro-purpurascentibus glabris gracilibus unico viso tantum 1–2 mm. crasso. Folia opposita glaberrima etiam eciliata tenuiter petiolata petiolis vix submarginatis usque ad 1.5 cm. longis, petiolo adjecto 4–6.5 cm. longa, circumambitu deltoideo-ovata, bipinnatisecta, foliolis plerumque 5, terminali inferioribusque saepius 5-partitis medianis circ. 3-partitis (segmentis lineari-oblongis, membranaceis, saepius 2–3.5 mm. latis, apice mucronatis, rhachin marginatam simulantibus). Capitula (unicum visa) solitaria, pedunculum gracilem sparsim patenti-hispidum ±3 cm. longum terminantia, pansa ad anthesin ±6 cm. lata et ±1.2 cm. alta, disco ±1.3 cm. lato. Involucrum (unicum visum) late depresso-campanulatum; bracteis exterioribus ±8, lineari-lanceolatis, apice vix acutis, faciebus subsparsim hispidulis, 6–9 mm. longis; interioribus late oblongo-lanceolatis, margine diaphano flavidis, alibi purpureo-brunneis, tergo glabratis, apice puberulentis, circ. 8–9.5 mm. altis. Flores ligulati ±8, flavi, ligula plus minusve lanceolato-oblongi, apice subintegri, circ. 2.5 cm. longi. Paleae lineares, glabrae vel glabratae, infra stramineae, supra coloratae, 7–8.5 mm. longae et sub 1 mm. latae. Styli rami pro floribus tubulosis sensim vel subabrupte caudati. Achaenia matura ignota. Ovaria vel achaenia immatura plana, exalata, atro-brunnea, utraque facie glaberrima etiam circ. 8-sulculata et mediane plus minusve costata, apice marginibusque erecto-setosa, corpore

2.5–3.5 mm. longa et circ. 1 mm. lata, biaristata aristis suberectis acribus nudis 1–1.5 mm. longis.

Shrub, branched, 1.8–3.6 meters tall; branches tetragonal, sulculate, finally blackish-purple, glabrous, slender, (the single one seen) only 1–2 mm. thick. Leaves opposite, very glabrous, even eciliate, slenderly petiolate, 4–6.5 cm. long including petiole, deltoid-ovate in outline, bipinnatisect; leaflets commonly 5, terminal and lower ones more often 5-parted, median ones about 3-parted (segments linear-oblong, membranaceous, more often 2–3.5 mm. wide, at apex mucronate, simulating the winged rachis); petiole scarcely submargined, up to 1.5 cm. long. Capitula (a single one seen) solitary, terminating the slender, sparsely spreading-hispid, and ±3 cm. long peduncle, ±6 cm. wide when expanded at anthesis and ±1.2 cm. tall, the disc ±1.3 cm. wide. Involucre (only one seen) broadly depressed-campanulate; outer bracts ±8, linear-lanceolate, at apex scarcely acute, on faces subsparsely hispidulous, 6–9 mm. long; inner bracts widely oblong-lanceolate, yellow on the diaphanous margin, elsewhere purple-brown, dorsally glabrate, apically puberulent, about 8–9.5 mm. tall. Ligulate florets ±8, yellow, with more or less lanceolate-oblong ligule, at apex subentire, about 2.5 cm. long. Paleae linear, glabrous or glabrate, straw-colored below, otherwise colored above, 7–8.5 mm. long and less than 1 mm. wide. Style-branches gradually or subabruptly caudate. Mature achenes unknown. Ovaries or immature achenes flat, wingless, blackish-brown, on each surface very glabrous also about 8-sulculate and medianly more or less costate, at apex and margins erect-setose, as to body about 2.5–3.5 mm. long and about 1 mm. wide, biaristate; aristae suberect, sharp, nude, 1–1.5 mm. long.

Specimens examined: *C. Gilbert Rogers* 133, a strong-growing, branched shrub 6–12 feet tall, in lower part of open scrub-forest zone, alt. 7,300 feet, Kimengalia Stream, above Rongai, north slopes of Mount Kilimanjaro, Tanganyika Territory, December 1, 1932 (type, Kew).

In the key presented in my monograph on *Bidens* (Field Mus. Bot. Ser. 16. 1937), this species would stand under the second letter *i* at the bottom of page 68. From the four species there listed it may be immediately distinguished as follows: from *B. Elliotii* in having leaves (petiole included) 4–6.5 not mostly 6–10 or even –17 cm. long, their leaflets comparatively wider and much less elongate-linear; from *B. Taylori* in having flowering-heads much wider than 2–2.5 cm.; from *B. Schlechteri* in having heads at anthesis ±6 not 3–4.5 cm. wide,

branches leafy up to the short (±3 cm. long) peduncles, not subnude toward the often elongate (up to 16 cm. long) peduncles, terminal leaf-lobe commonly 6–15 mm. long past its lateral lobules or teeth, not 2–5 cm.; from *B. kivuensis* in being glabrous and in having biaristate ovaries.

Bidens taitensis Sherff, Bot. Gaz. 90: 396. 1930; Field Mus. Bot. Ser. 16: 552, *pl. 141.* 1937.

Bidens taitensis was founded upon a single specimen collected by J. M. Hildebrandt, no. 2,432*a*, at altitude of 600–900 meters, Taita (Teita) Mountains, Kenya Colony, February, 1877 (Berl.). Apparently Hildebrandt had found only the one plant growing. The type description was necessarily somewhat incomplete. More recently a lone additional specimen of this seemingly rare species has been collected: *Miss E. R. Napier* 1,321, an herb 3–6 feet tall, only one plant seen, growing on hillside in association with *Vernonia* sp. and scrub, alt. 4,500 feet, Wusi, Taita Hills, Kenya Colony, June 17, 1931 (Kew). My original description may now be amplified as follows: Height 0.9–1.8 meters. Flowering heads (a single one seen) ±5 cm. wide. Exterior involucral bracts at times mostly ovate-oblong. Ligulate florets 8.

Bidens Hoffmannii angustata var. nov.

Foliorum segmenta involuta plerumque tantum 0.3–0.6 mm. lata. Capitula pansa ad anthesin sub 2 cm. lata. Involucri bracteae exteriores saepius 8, tergo non nisi ad basim hispidae sed marginibus praecipue inferne longo-ciliatae.

Leaf-segments involute, commonly only 0.3–0.6 mm. wide. Capitula less than 2 cm. across when expanded at anthesis. Exterior involucral bracts more often 8, dorsally not hispid unless at base but long-ciliate on margins especially below.

Specimens examined: *Mrs. Brodhurst-Hill* 215, growing 2.5 feet tall, in big, spreading clumps along the sides of the Turbo-Soy roads, in very poor soil and murram, Kenya Colony (type, Kew).

Bidens Bequaertii amplior var. nov.

Folia majora, principalia ±1 dm. longa, foliolis minus patentibus segmentis angustioribus ±1 mm. latis. Flores ligulati numerosiori 7 vel 8. Achaenia centralia superne arcuata ±1.5 cm. longa, aristis 2 probabiliter numquam 3.

Leaves larger, principal ones ±1 dm. long; leaflets less spreading; their segments narrower, ±1 mm. wide. Ligulate florets more

numerous, 7 or 8. Central achenes curved above, ±1.5 cm. long; aristae 2 and probably never 3.

Specimens examined: *Rear-Admiral H. Lynes* no. *I.h.* 263*a*, alt. 6,200–6,400 feet, Mt. Mferu, Iringa, central Tanganyika Territory, March 22, 1932 (type, Kew).

Bidens dolosa sp. nov.

Herba perennis usque ad 2.4 m. alta, caule subtereti sulculato glabrato vel superne subglanduloso-pubescenti. Folia opposita anguste petiolata petiolis usque ad 5 cm. longis, petiolo adjecto ±1.7 dm. longa; lamina circumambitu deltoideo-ovata, pinnatim 5–7-partita, foliolis membranaceis plerumque eciliatis, acriter serrata dentibus pro utroque latere saepius 20–30, supra glabratis, infra praecipue secundum venas brunneo-tomentosis, lanceolatis, apice plus minusve attenuatis, basi sessilibus, medianis superioribusque alato-decurrentibus, plerumque 4–7 cm. longis et 1.5–2.2 cm. latis, terminali plus minusve imperfecte tripartito. Capitula corymbose disposita (unica inflorescentia visa ±11-capitulata circ. 1.5 dm. lata et sub 1 dm. alta), radiata, circ. 4 cm. lata et circ. 1 cm. alta, graciliter pedicellata pedicellis glanduloso-pubescentibus plerumque sub 3 cm. longis. Involucri bracteae subaequales exteriores 6–8, lanceolato-lineares, intus vix extus plus minusve dense adpresso-hispidulae, longitudinaliter 3- vel sub-5-nervatae, ±7 mm. longae; interiores latiores, extus margine lato excepto adpresso-hispidulae. Flores ligulati 6–8, flavi, 1.5–2 cm. longi, ligula anguste vel moderate elliptico-oblongi, apice angustata et vix vel non denticulati. Flores tubulosi interdum 4- plerumque 5-dentati, paleas lineari-oblongas late marginatas apice obtusas plerumque superantes. Styli rami abrupte caudati. Achaenia matura ignota. Ovaria plana, oblonga vel subcuneato-oblonga, faciebus non nisi apicem versus pubescentia, marginibus apiceque erecto-hispida, corpore 2–2.5 mm. longa et sub 1 mm. lata, biaristata aristis gracilibus circ. 2 mm. longis, superne paucihamosis hamis superioribus saepius retrorsis aliis erectis.

Perennial herb up to 2.4 meters tall; stem subterete, minutely grooved, glabrate or on upper part subglandular-pubescent. Leaves opposite, narrowly petiolate with petioles up to 5 cm. long, a single leaf ±1.7 dm. long including its petiole; blade deltoid-ovate in outline, pinnately 5–7-parted; leaflets membranaceous, commonly eciliate, sharply serrate with more often 20–30 teeth to each side, glabrate above, brown-tomentose underneath especially along the veins, lanceolate, at apex more or less attenuate, at base sessile,

median and upper ones alate-decurrent, commonly 4–7 cm. long and 1.5–2.2 cm. wide, terminal one more or less imperfectly tripartite. Capitula corymbosely disposed (a lone inflorescence seen, this measuring about 1.5 dm. across and less than 1 dm. tall, and having ±11 capitula), radiate, about 4 cm. wide and about 1 cm. tall, slenderly pedicellate with pedicels glandular-pubescent and commonly under 3 cm. long. Involucral bracts subequal; exterior ones 6–8, lanceolate-linear, slightly appressed-hispidulous within but more or less densely so without, lengthwise 3- or sub-5-nerved, ±7 mm. long; interior ones broader, appressed-hispidulous on outer surface except for the broad margin. Ligulate florets 6–8, yellow, 1.5–2 cm. long; ligule narrowly or moderately elliptic-oblong, at apex narrowed and scarcely or not at all denticulate. Tubular florets at times 4- commonly 5-dentate, surpassing the paleae; these linear-oblong, widely margined, at apex obtuse. Style-branches abruptly caudate. Mature achenes unknown. Ovaries flat, oblong or subcuneate-oblong, glabrous on faces unless toward apex, on margins and at apex erect-hispid, as to body 2–2.5 mm. long and under 1 mm. wide, biaristate; aristae slender, about 2 mm. long, few-barbed above, the upper barbs more often retrorse the others erect.

Specimens examined: *P. J. Greenway* 3,475, perennial herb up to 8 feet tall, forming a dominant in secondary bush in cleared areas in *Myrica-Macaranga-Gymnosporia-Dodonaea* mist forest, common throughout whole area, alt. 6,400 feet, East Mufindi, Iringa Province, Tanganyika Territory, August 3, 1933 (type, Kew).

A plant of the section *Psilocarpaea* DC. In the herbarium it offers a deceiving resemblance in habit (whence the trivial name) to *Bidens rubifolia* H.B.K. of South America, a species differing in having a climbing habit and the very different ovaries (and of course achenes) which characterize the section *Greenmania* Sherff. In the analytical key of my monograph on the genus *Bidens*, *B. dolosa* would stand next to *B. magnifolia* (Field Mus. Bot. Ser. 16: 65. 1937). From *B. magnifolia* it differs decidedly in its scarcely glandular-punctate, never subbipinnatifid leaves, narrower and more finely serrate leaflets, manifestly glandular-pubescent not subglabrous branches of the inflorescence, dorsally hispid involucral bracts, narrower ray-florets, etc.

Bidens Chandleri sp. nov.

Herba perennis, pallida, 1.2–1.4 m. alta, e radice lignea orta. Caulis subsimplex, gracilis, infra obscure supra moderate tetragonus, glaber vel apicem versus paulum hispidulus; internodiis saepius 8–11

cm. longis. Folia opposita vel summa alterna, simplicia, linearia, ad apicem breviter sed basim versus elongate attenuata, marginibus et infra secundum costam medianam hispida vel scabro-subspinulosa alibi glabra vel sparsissime setosa, principalia 8–12 cm. longa et 3–5 mm. lata. Capitula pauca (±3 ad rami apicem) corymbose disposita, graciliter pedunculata pedunculo sparsim hispidulo usque ad 1.2 dm. longo, radiata, pansa ad anthesin 3–4 cm. lata et circ. 1 cm. alta. Involucri basi valde albo-hispidi bracteae subaequales exteriores 6–10, lineari-oblongae, apice obtusae vel rotundae, extus hispidulae, 8–10 mm. longae, nervo mediano rare manifesto; interiores oblongo-ovatae, apice breviter attenuatae, late diaphano-marginatae, extus irregulariter hispidae. Flores ligulati probabiliter 8, subaurantiaci, ligula oblanceolato-oblongi, apice denticulati, 2–2.5 cm. longi. Paleae oblonge lineares, apice obtuso vel triangulato-acuto coloratae, circ. 9–10 mm. longae. Achaenia vix matura obcompresse plana, lineari-oblonga, exalata, brunneo-atra, utrinque circ. 8-sulculata, inferne sparsim superne subsparsim vel marginibus dense setosa setis plus minusve erectis, corpore ±8 mm. longa et ±1.6 mm. lata, apice erecte setoso biaristata aristis saepius moderate patentibus gracilibus stramineis circ. 2 mm. longis nudis vel supra rare unica seta antrorsum barbatis.

Perennial herb, pale, 1.2–1.4 meters tall, from a woody root. Stem subsimple, slender, obscurely quadrangular below but moderately so above, glabrous or toward top somewhat hispidulous; internodes more often 8–11 cm. long. Leaves opposite or the topmost ones alternate, simple, linear, shortly attenuate at apex but elongately so toward base, hispid or scabro-subspinulose at margins and along median rib beneath, elsewhere glabrous or very sparsely setose, principal ones 8–12 cm. long and 3–5 mm. wide. Capitula few (±3 at apex of a branch), corymbosely disposed, slenderly pedunculate with a peduncle sparsely hispidulous and up to 1.2 dm. long, radiate, 3–4 cm. wide when expanded at anthesis and about 1 cm. tall. Involucre strongly white-hispid at base, its bracts subequal; outer ones 6–10, linear-oblong, at apex obtuse or rounded, hispidulous on outer surface, 8–10 mm. long, their median nerve rarely conspicuous; interior ones oblong-ovate, at apex shortly attenuate, widely diaphanous-margined, irregularly hispid on outer surface. Ligulate florets probably 8, somewhat orange-colored, with oblanceolate-oblong ligule, at apex denticulate, 2–2.5 cm. long. Paleae oblong-linear, apically obtuse or triangulate-acute and colored, about 9–10 mm. long. Achenes scarcely mature, obcompressedly flat, linear-

oblong, without wings, brownish-black, about 8-sulculate on each face, more or less erectly setose (below sparsely, above subsparsely or at margins densely so), as to body ±8 mm. long and ±1.6 mm. wide, at apex erectly setose and biaristate; aristae more often moderately spreading, slender, straw-colored, about 2 mm. long, naked or rarely barbed above with a single antrorse seta.

Specimens examined: *Percy Chandler* 939, growing 4 to 4.5 feet tall, alt. 3,600 feet, Sere, Prov. Teso, Uganda, September, 1932 (type, Kew).

An ally of *Bidens Schweinfurthii* Sherff, from which it differs at once in its more delicate habit, in its narrower leaves, and in numerous capitular characters.

Bidens superba brachycarpa var. nov.

A specie ipsa differt: Pedicelli (usque ad 3 cm. longi) forsitan longiores; involucri bracteis hispidioribus, exterioribus tantum 4–9 mm. non 1–1.6 cm. longis; ligulis angustioribus; achaeniis ignotis, ovariorum aristis circ. 2.5 mm. longis.

Differs from species proper: Pedicels (up to 3 cm. long) perhaps longer; involucral bracts more hispid, outer ones only 4–9 mm. not 1–1.6 cm. long; ligules narrower; achenes unknown, ovarian aristae about 2.5 mm. long.

Specimens examined: *J. D. Snowden* 1,594, suffruticose herb in grassland and old cultivations, alt. 7,000 feet, Kigezi, Mabungo Hill, southwesternmost Uganda, Kenya Colony, October 24, 1929 (type, Kew).

Bidens Dielsii incisior var. nov.

Folia rhombo-ovata, plus minusve incise acerrimeque dentata dentibus saepius antrorsum flexis sinibus inferioribus interdum fere usque ad rhachin incisis, sub 8 cm. longa, faciebus glabra vel primum papillato-hispidula. Capitula magis congregata, pedicellis circ. 1–3 cm. longis. Achaenia matura ignota.

Leaves rhombic-ovate, more or less incisedly and very sharply dentate, under 8 cm. long, the surfaces glabrous or at first papillate-hispidulous, the teeth more often antrorsely curved, the lower sinuses at times cut almost to the rachis. Capitula grouped more closely together, pedicels about 1–3 cm. long. Mature achenes unknown.

Specimens examined: *L. C. C. Liebenberg* 367 (field no. 415), growing ±2 feet tall, near top of Mt. Moroto, Uganda, Kenya Colony, July, 1930 (type, Kew).

Bidens Grantii exaltata var. nov.

Fruticosa, ±3 m. alta, ramis tetragonis, sparsim vel sparsissime hispidis, herbaceis, internodiis superioribus quam foliis multo longioribus. Folia laxius segmentata, supra moderate infra paulo densius adpresso-hispida, ±7 cm. longa (inferiora non visa). Capitula pansa ad anthesin circ. 3 cm. lata et 7–9 mm. alta. Flores ligulati circ. 1.5 cm. longi, ligula anguste oblongo-elliptici. Achaenia corpore 3–5 mm. longa.

Fruticose, ±3 meters tall, the tetragonal and sparsely or very sparsely hispid branches herbaceous, the upper internodes much longer than the leaves; these more remotely segmented, above moderately below a little more densely appressed-hispid, ±7 cm. long (lower ones not seen). Capitula about 3 cm. wide and 7–9 mm. tall when expanded at anthesis. Ligulate florets about 1.5 cm. long, the ligule narrowly oblong-elliptic. Achenial body 3–5 mm. long.

Specimens examined: *R. W. Mettam* 255, woody shrub 10 feet tall, alt. 8,100 feet, Molo grasslands, Naivasha Province, western Kenya Colony, 1930 (type, Kew).

In the key given in my monograph on the genus *Bidens* (Field Mus. Bot. Ser. 16: 539. 1937) the present variety would run at once to *B. Grantii* proper. It differs more or less from *B. Grantii*, however, in the characters noted, chief among these being the smaller flowering-heads and, apparently, the reported shrubby habit and gigantic size. As stated in my monograph (p. 540), the type specimen of *B. Grantii* itself lacks the basal portion, but Oliver, in his original description (Trans. Linn. Soc. 29: 98, *pl. 65.* 1873), described the species as an annual. The vars. *Dawei* Sherff and *Scaettae* Sherff have definitely annual roots. Var. *Stapfii* Sherff, studied by Skan in cultivation (Curtis's Mag. *pl. 8,110.* 1906), was described as a perennial. Var. *exaltata* is seen, from the collector's data, to be a tall, woody shrub and thus clearly a perennial. The spray upon the type sheet is slightly less than 6 dm. long and might well be mistaken as representing the greater part of an annual herb.

Bidens filiformis sp. nov.

Herba annua, erecta, plus minusve glabra, supra divergenti-ramosa, ±3 dm. alta, caule sub 1.5 mm. crasso et ramis gracillimis tetragonis. Folia opposita, petiolata petiolis glabratis vel sparsim ciliatis basi connatis 0.4–1.5 cm. longis, petiolo adjecto 3–7.5 cm. longa, plerumque pinnata foliolis 3–5 filiformibus (quam rhachi ±0.3 mm. lato paulo latioribus) glabratis vel sparsim setulosis usque

ad 4 cm. longis inferioribus lateralibus oppositis. Capitula solitatim ramos terminantia (pedunculis gracillimis saepius 4–9 cm. longis), radiata, pansa ad anthesin 3–3.5 cm. lata et 7–9 mm. alta. Involucri bracteae exteriores circ. 8, pallidae, angustissime oblongo-lineares et distantes, plerumque glabratae eciliataeque, apice calloso subobtusae, plerumque 4–5 mm. longae; interiores ovato-oblongae, paulo breviores, extus minutissime plus minusve setulosae, marginibus latis diaphanae et apicem versus plus minusve purpureae. Flores ligulati plerumque 8, flavi vel corollae guttur versus aurantiaci, ±1.5 cm. longi, ligula angustissime oblanceolato-lineares, apice minutissime 2-denticulati vel subintegri. Paleae lanceolatae, exteriores superne purpureae et apice puberulento acutae, interiores apice flavo elongato-tortae et demum usque ad 1.3 cm. longae. Achaenia 20–35, atra, anguste elongato-linearia, plana vel convexo-concava utraque facie circ. 8-sulculata et erecto-setulosa vel apicem basimque versus glabra, marginibus erecto-setosa, corpore 0.8–1.3 cm. longa et ±0.7 mm. lata, apice stramineo dense erecto-setosa et biaristata, aristis stramineis gracilibus subdivergentibus apice retrorsum 1- vel 2-hamosis alibi glaberrimis circ. 1 mm. longis.

Annual herb, erect, more or less glabrous, divergently branched above, ±3 dm. tall; stem 1.5 mm. or less thick, tetragonal as are the very slender branches. Leaves opposite, petiolate, 3–7.5 cm. long including petioles (these glabrate or sparsely ciliate, connate at base, 0.4–1.5 cm. long), commonly pinnate; leaflets 3–5, filiform, glabrate or sparsely setulose, up to 4 cm. long, lower lateral ones opposite, the somewhat narrower rachis under 0.3 mm. wide. Capitula singly disposed at ends of branches (these really the peduncles, very slender and more often 4–9 cm. long), radiate, 7–9 mm. tall and when expanded at anthesis 3–3.5 cm. wide. Involucre's exterior bracts about 8, pallid, very narrowly oblong-linear and mutually distant, commonly glabrate and eciliate, apically calloused and subobtuse, commonly 4–5 mm. long; interior bracts ovate-oblong, slightly shorter, on outer surface very minutely more or less setulose, diaphanous along the broad margins and more or less purple toward the apex. Ligulate florets commonly 8, yellow or toward throat of corolla orange, ±1.5 cm. long, the ligule very narrowly oblanceolate-linear and at apex very minutely 2-denticulate or subentire. Paleae lanceolate, outer ones supernally purple and at puberulent apex acute, inner ones elongate-twisted at yellow apex and finally up to 1.3 cm. long. Achenes 20–35, dull-black, narrowly elongate-linear, flat or convexo-concave, on each face about 8-sulculate and erectly setulose

or toward both ends glabrous, marginally erect-setose, body 0.8–1.3 cm. long and ±0.7 mm. wide, the straw-colored apex densely erect-setose and biaristate; aristae straw-colored, delicate, subdivergent, at apex retrorsely 1- or 2-barbed, elsewhere very glabrous, about 1 mm. long.

Specimens examined: *B. D. Burtt* 6,269, alt. 4,500–5,000 feet, Lake Chila, Northern Rhodesia, April, 1936 (type, Field).

In the key presented in my monograph on *Bidens* (Field Mus. Bot. Ser. 16: 62. 1937) *B. filiformis* would stand under the first letter *f* at the top of the page, with *B. Schimperi*. From that species it differs: ±3 dm. not 5–15 dm. tall, glabrous or nearly so; leaves normally 1- not 2–3-pinnate, at most 7.5 not up to 15 cm. long, their divisions filiform, not linear-lanceolate or broader; exterior involucral bracts not dilated above; achenes ±0.7 not 2–2.6 mm. wide, their aristae about 1 not 2.5–4 mm. long, etc.

From the northeastern Belgian Congo *B. Onisciformis*, which was included parenthetically and somewhat interrogatively under the same letter *f* in the key cited, *B. filiformis* differs in its more branched and obviously annual habit, its elongate and not onisciform achenes, etc. Unfortunately, the conspicuously radiate *B. diversa* var. *megaglossa* was misplaced with the shortly radiate *B. diversa* proper under the second letter *e* on the page cited, though belonging in reality under the first *e*. Under the first *e*, this var. *megaglossa* would likewise go to the first *f*. *B. filiformis*, though habitally somewhat similar to *B. diversa* var. *megaglossa*, differs at once in its proportionately narrower, more elongate outer involucral bracts, these commonly eciliate and 4–5 mm. not ciliate and only 1–2 mm. long, in having a purplish tinge near the tops of the inner involucral bracts and of the outer paleae, etc.

Bidens modesta sp. nov.

Herba perennis, infra subfruticosa, erecta, ±5 dm. alta; caule simplici subsimplicive, gracili (1.5–3 mm. crasso), subtetragono, sulculato, glabro. Folia opposita, subpauca vel subnumerosa, principalia tenuiter petiolata petiolis glabris vel infra sparsissime ciliatis plerumque 2–3.5 cm. longis angustissime marginatis basi connatis, petiolo adjecto 6–11 cm. longa et 1.5–3 cm. lata; lamina subanguste ovato-rhomboidea vel sublate lanceolato-rhomboidea, membranacea, glabra (etiam eciliata) vel infra interdum perpaucis setis vestita, infra medium plerumque cuneata integraque, supra medium minute grosseve dentata 2–4 dentibus pro utroque latere, apice acuta vel

subacuminata, venis principalibus paucis et perspicue antrorsis. Capitula perpauca (±2), graciliter pedunculata pedunculo glabro usque ad 1.6 dm. longo, radiata, pansa ad anthesin circ. 4 cm. lata et ±1.3 cm. alta. Involucri basaliter sparsissime vel moderate hispiduli bracteae exteriores circ. 8, adpressae, oblongae, apice calloso obtusae vel rotundatae, circ. 5–6 mm. longae, tergo glabrae vel porriginosae; interiores ovatae vel ovato-oblongae, tergo glabratae vel minutissime puberulentae, apice pubescentes, 8–10 mm. longae. Flores ligulati circ. 8, flavi, ±2 cm. longi, ligula lineari-oblongi, apice subintegri, extus glabrati, intus velutino-puberulenti. Paleae lineari-oblongi quam involucrum breviores. Flores tubulosi corolla extus glaberrimi et 5.5–6 mm. longi. Achaenia matura non visa. Ovaria plana, lineari-oblonga, atro-brunnea, faciebus glabrata, marginibus erecto-setulosa setulis e tuberculo saepius ortis, corpore ±4 mm. longa et sub 1 mm. lata, apice erecte setosa et biaristata; aristis gracilibus, divergentibus, flavo-brunneis, circ. 2.5 mm. longis, intus continenter extus sparsim vel interrupte retrorso-hamosis.

Perennial herb, suffruticose below, erect, ±5 dm. tall; stem simple or subsimple, slender (1.5–3 mm. thick), subquadrangular, sulculate, glabrous. Leaves opposite, somewhat few or somewhat numerous, principal ones slenderly petiolate, 1.5–3 cm. wide and 6–11 cm. long including petioles; these glabrous or toward base very sparsely ciliate, commonly 2–3.5 cm. long, very narrowly marginate, connate at base; blades subnarrowly ovate-rhomboid or subwidely lanceolate-rhomboid, membranaceous, glabrous (even eciliate) or sometimes clothed below with a very few setae, commonly cuneate and entire below middle, minutely or coarsely dentate above middle with 2–4 teeth to each side, at apex acute or subacuminate, principal veins few and conspicuously antrorse. Capitula very few (±2), slenderly pedunculate, radiate, expanded at anthesis about 4 cm. wide and ±1.3 cm. tall; peduncle glabrous, up to 1.6 dm. long. Involucre at base very sparsely or moderately hispidulous; exterior bracts about 8, appressed, oblong, calloused and obtuse or rounded at apex, about 5–6 mm. long, dorsally glabrous or scurfy; interior bracts ovate or ovate-oblong, dorsally glabrate or very minutely puberulent, apically pubescent, 8–10 mm. long. Ligulate florets about 8, yellow, ±2 cm. long; ligule linear-oblong, at apex subentire, externally glabrate, internally velvety-puberulent. Paleae linear-oblong, shorter than the involucre. Mature achenes not seen. Ovaries flat, linear-oblong, blackish-brown, on faces glabrate, on margins erect-setulose with setulae more often arising from a tubercle, as to body ±4 mm. long

and under 1 mm. wide, at apex erectly setose and biaristate; aristae slender, divergent, yellowish-brown, about 2.5 mm. long, on inner edge continuously on outer sparsely or interruptedly retrorse-barbed.

Specimens examined: *John Gossweiler* 11,899, a perennial much dispersed in *hiemifruticeta*, alt. 1,700 meters, Huambo, New Lisbon, Angola, 1937 (type, Kew: cotype, Field).

In the key presented in my monograph on *Bidens* (Field Mus. Bot. Ser. 16: 63. 1937) *B. modesta* would stand with *B. Moorei* and its var. *verrucosa*, under the second letter *i* at the bottom of the page. From these it differs in its longer leaves, these petiolate not sessile; its smaller capitula, hence smaller floral and fruiting parts, doubtless shorter achenial aristae and more glabrous achenial faces, etc.

Bidens Gossweileri sp. nov.

Herba perennis, subfruticosa, erecta, omnino glaberrima, ±5 dm. alta, supra ramosa ramis suberectis plus minusve tetragonis, caule inferne nudo sed mediane confertissime folioso. Folia plerumque opposita, petiolata petiolis angustis planis saepius 1–2 cm. longis et 0.7–1.4 mm. latis, petiolo adjecto 5–12 cm. longis; lamina pinnata vel vix subbipinnata; foliolis saepius 3–5, quam rhachi simili paulo latioribus (angustissime linearibus et tantum 1–2.2 mm. latis), 1–6 cm. longis, eciliatis, apice acutis subacutisve, plerumque simplicibus, lateralibus saepius oppositis, nervo mediano pro una facie obscuro pro altera plano perspicuoque. Capitula pauca (±6 pro unica planta), subgraciliter pedunculata pedunculo usque ad 1.6 dm. longo, radiata, pansa ad anthesin ±2.5 cm. lata et ±1.1 cm. alta. Involucri bracteae exteriores 7–12, lanceolatae vel lineari-oblongae, 1–3-seriales, adpressae, apice induratae et obtusae rotundaeve, 4–7 mm. longae; interiores lanceolato-oblongae, apice minutissime pubescentes aliter glabrae, usque ad 9 mm. longae. Flores ligulati circ. 8, flavi, ±1.2 cm. longi, ligula lineari-oblongi, apice subintegro subacuti, facie superiore (interiore) densissime velutino-puberulenti, alibi glabrati. Paleae oblongo-lineares, apice acutae, sub apice saepe 1-denticulatae, 7–9 mm. longae. Achaenia submatura linearia vel lineari-oblonga, brunneo-grisea vel atro-brunnea, plana, utraque facie circ. 8-sulculata, faciebus marginibusque dense erecto-setosa (vel imis faciebus glabratis), corpore 5–9.5 mm. longa et 0.5–1 mm. lata, apice erecto-setosa et biaristata; aristis subrectis, moderate divergentibus, de apice usque ad basim retrorsum hamosis, plerumque 2–2.5 mm. longis.

Perennial herb, suffruticose, erect, very glabrous throughout, ±5 dm. tall, branched above with suberect and more or less tetragonal branches; stem nude toward base but very densely foliose at middle. Leaves commonly opposite, petiolate, 5–12 cm. long including petioles; these narrow, flat, more often 1–2 cm. long and 0.7–1.4 mm. wide; blades pinnate or scarcely subbipinnate; leaflets more often 3–5, very narrowly linear and only 1–2.2 mm. wide, a little wider than the similar rachis, 1–6 cm. long, eciliate, at apex acute or subacute, commonly simple, lateral ones more often opposite, the median nerve obscure for one surface but flat and conspicuous for the other. Capitula few (±6 to a single plant), somewhat delicately pedunculate with a peduncle up to 1.6 dm. long, radiate, expanded at anthesis ±2.5 cm. wide and ±1.1 cm. tall. Involucre's exterior bracts 7–12, lanceolate or linear-oblong, 1–3-seriate, appressed, apically indurated and obtuse or rounded, 4–7 mm. long; interior bracts lanceolate-oblong, at apex very minutely pubescent, otherwise glabrous, up to 9 mm. long. Ligulate florets about 8, yellow, ±1.2 cm. long; ligule linear-oblong, at apex subentire and subacute, on upper or inner face very densely velvety-puberulent, elsewhere glabrate. Paleae oblong-linear, at apex acute, below apex often 1-denticulate, 7–9 mm. long. Achenes when submature linear-oblong, brownish-gray or blackish-brown, flat, on each face about 8-sulculate, on faces and margins densely erect-setose (or at bottom of faces glabrate), as to body 5–9.5 mm. long and 0.5–1 mm. wide, at apex erect-setose and biaristate; aristae nearly straight, moderately divergent, from the apex almost to the base retrorsely barbed, commonly 2–2.5 mm. long.

Specimens examined: *John Gossweiler* 11,845, dispersed in *hiemi-fruticeta*, alt. 1,000 meters, Xassengue-Caiango, near Cuango River, Lunda region, Angola, April, 1937 (type, Kew).

In the key presented in my monograph on *Bidens* (Field Mus. Bot. Ser. 16: 65. 1937), *B. Gossweileri* would go to the first letter *o*, p. 65, and thus to *B. Hoffmannii*. From that species it differs in having leaves 5–12 not 2–5 cm. long, eciliate and longer leaf-petioles, proportionately narrower and longer leaf-divisions, 7–12 apically obtuse or rounded rather than mostly 6 apically acute exterior involucral bracts, doubtless narrower achenial bodies, aristae at least 2–2.5 not 1.5–1.75 mm. long, etc.

Bidens Bruceae Sherff, Bot. Gaz. 97: 606. 1936.

This species was named after Miss E. M. Bruce, but the trivial name was unfortunately misspelled *Brucei* at the time of its original publication.

Bidens coronata (L.) Britt. Bull. Torr. Bot. Club 20: 281. 1893; cf. Sherff, Bot. Gaz. 56: 495. 1913; *B. coronata* vars. *typica* Fern., *brachyodonta* Fern., and *trichosperma* (Michx.) Fern. Rhodora 40: 349, 350. 1938.

Fernald (op. cit. 348), relying upon an all too scanty assortment of specimens, divides *B. coronata* into four varieties. His analytical key to these varieties proves unusable when applied to much of the material found in various herbaria. During my own monographic work over a period of a quarter of a century upon *Bidens*, I myself tried several times to arrange the specimens of *B. coronata* under several varieties, but finally concluded that only the variety *tenuiloba*, as apart from the species proper (var. *typica* Fern.) was worthy. Even the var. *tenuiloba* appears to intergrade with *B. coronata* proper. In general, however, the leaf-divisions of var. *tenuiloba* are narrower and its achenes shorter.

Fernald's key to the varieties of *B. coronata* is based largely on achenial characters. How he knows what these are for his var. *typica* I cannot say. It is true that in 1915 I sent him a print from my large photograph of the Linnean type. It likewise is true that, under date of January 21, 1915, he wrote me: "There is no doubt I think, that your photograph of *B. coronata* represents *B. trichosperma* or something like it. Furthermore I find that Dr. Gray had a fragment from the Linnean herbarium (you will note in your photograph that some heads are gone) and that shows perfectly characteristic fruit of *B. trichosperma*, not of '*B. coronata*' of recent authors." However, in April of the same year, I publicly quoted from Fernald's letter (Bot. Gaz. 59: 314). Whereupon, I received from Dr. B. Daydon Jackson, General Secretary of the Linnean Society, a letter under date of May 10, 1915, expressing surprise regarding the reputed Gray fragment. To quote from his letter: "A few days ago I wrote to Dr. Fernald, asking for the history of the Gray fragment mentioned. . . . as I cannot understand how a fragment, even if loose, was removed from the Linnean herbarium, a process which would be regarded by our Council as sacrilegious, and will horrify them when announced. I will wait however for Dr. Fernald's reply." Under date of May 21, 1915, Professor Fernald sent this awaited reply, a copy of which, in Miss Mary A. Day's well known handwriting and sent me at that time by Professor Fernald himself, lies before me. To quote from it regarding the "fragment": "I find that, far from being 'certain heads' as implied in Mr. Sherff's note, it consists of three florets in a packet labelled by Dr. Gray 'Ex Hb. Linn.' " And in a letter by Profes-

sor Fernald directly to me under date of June 2, 1915, he referred to what he had originally called a "fragment" as mere "bits (three florets, not heads) of *Coreopsis coronata.*"[1] Granting that the three florets whose presence at Gray Herbarium was acknowledged by Fernald were indeed all of Gray's fragment, it seems safe to presume that Gray obtained them, not as part of a mature head which at the time was removed from the type, but from one of the five or six flowering heads still possessed by it. These were comparatively young, only one being at full anthesis. To designate mere ovaries of florets thus derived as "perfectly characteristic fruit of *B. trichosperma*" as Fernald did in his letter of January 21, would seem indeed gratuitous, if not entirely misleading. In any case, it is difficult to understand how they could afford a satisfactory basis on which to delimit, in terms primarily of achenial (instead of foliar) characters, a var. *typica.*

Bidens heterodoxa var. **atheistica** Fern. Rhodora 34: 116. 1932; *B. infirma* Fern. op. cit. 40: 351, *pl. 507, figs. 1–3.* 1938.

Fernald, writing originally of this variety, stated: "Var. *atheistica,* essentially without awns, has the foliage, involucres, and other characters quite as in typical *B. heterodoxa.*" He later elevated it to specific rank, renaming it *Bidens infirma* in allusion doubtless to its habit of growth. His type and other cited material, now before me, seem nothing more than a variety of *B. heterodoxa.* They have a sprawling or diffuse growth-habit and thus are related to *B. heterodoxa* somewhat as *B. hyperborea* var. *gaspensis* Fern. is to *B. hyperborea* Greene, or as *B. cernua* var. *oligodonta* Fern. & St. J. is to *B. cernua* L. They have simple leaves and thus are related to *B. heterodoxa* somewhat as *B. connata* var. *petiolata* (Nutt.) Farw. is to *B. connata.* They have awnless or short-awned achenes and thus are related to *B. heterodoxa* somewhat as *B. aristosa* var. *mutica* A. Gr. *ex* Gatting. is to *B. aristosa* (Michx.) Britt. They have fewer florets in a capitulum than has *B. heterodoxa,* but, from a study of numerous species of *Bidens* in which forms or varieties are found with more diffuse habit and more numerous capitula, this may well be construed as being merely an expression or result of the growth-form. Fernald makes much of the more or less convex or subconic achenial apex, but this character is highly inconstant in various species of *Bidens,* especially those of the Polynesian section *Campylotheca* (Cass.) Nutt. (e.g., *B. macrocarpa* [Gray] Sherff; cf. Field Mus. Bot. Ser. 16: *pl. 17,*

[1] Clearly, if there was any error regarding the existence at Gray Herbarium of " 'certain heads' as implied in Mr. Sherff's note," I must regretfully attribute the blame to Fernald's own letter of January 21.

figs. h and *l*), and seems all too weak a character on which to attempt here a specific segregation.[1]

Coreopsis ochracea Lugardii var. nov.

Caules gracillimi, ±1 mm. crassi. Folia petiolo usque ad 1.5 cm. longo adjecto sub 5 cm. longa; segmentis saepius 3, sub 2.5 mm. latis. Capitula pansa ad anthesin sub 3.5 cm. lata. Involucri bracteae exteriores lineari-oblongae, ±6 mm. longae. Achaenia ignota. Ovaria exaristata sed apice marginibusque dense erecto-setosa.

Stems very slender, ±1 mm. thick. Leaves under 5 cm. long, including the petiole (this up to 1.5 cm. long); segments more often 3, under 2.5 mm. wide. Capitula less than 3.5 cm. wide when expanded at anthesis. Outer involucral bracts linear-oblong, ±6 mm. long. Achenes unknown. Ovaries exaristate but at apex and margins densely erect-setose.

Specimens examined: *Major E. J. Lugard K*4, growing erect and up to 2 feet tall, alt. 6,400 feet, Kapenguria, Kenya Colony, January 11, 1931 (type, Kew).

Coreopsis grandiflora Hogg *ex* Sweet, Brit. Fl. Gard. 2: *pl. 175.* 1826.

Fernald (Rhodora 40: 475. 1938) writes: "Although Sherff, l.c. 353, gives the mystifying range Missouri and Kansas southward to Florida, etc., he cites material from Georgia."

For those who quite naturally might be *mystified* by Fernald's incomplete and hence misleading quotation from what really was given in my original text, recourse should be had to the text itself (Field Mus. Bot. Ser. 16: 353. 1936): "Distribution: Missouri and Kansas southward to Florida, Louisiana, and New Mexico." This statement of geographic range would seem to lack those elements which ordinarily conduce to sincere mystification. I am in turn,

[1] It is indeed unfortunate that the species *B. heterodoxa* was ever based upon the enigmatic material which was taken for its type. One cannot help feeling that the specimens later discovered and used to typify, for example, *B. heterodoxa* var. *Monardaefolia* Fern. would have given a more definite and understandable basis if they could have been used for the type basis of the species proper (leaving the form actually named *B. heterodoxa* to be given a varietal rank instead). However, *B. heterodoxa* and its varieties are found mostly in brackish situations of northeastern North America, and so also are the closely allied *B. hyperborea* Greene and its varieties. It is entirely logical, therefore, to interpret the intra-relationships of *B. heterodoxa* in the light of those found in *B. hyperborea*. This is undoubtedly what Fernald did when he originally construed his *B. infirma* as *B. heterodoxa* var. *atheistica*, since he possessed some years ago, either singly or in conjunction with his students Harold St. John, N. C. Fassett, and H. K. Svenson, an unrivaled field-knowledge of *B. hyperborea*. His earlier judgment, reached at more nearly the zenith of his field activity in the study of *B. heterodoxa* and *B. hyperborea* (inclusive of their varieties), is the judgment that seems to me the safer one to accept.

however, much mystified (1) by Fernald's omission of the words "Louisiana, and New Mexico" given in my original text and (2) by his surprise that Georgia material should be cited from the range as it was actually described.

Coreopsis Linifolia Nutt. Journ. Acad. Phila. 7: 75. 1834; *C. Oniscicarpa* Fern. Rhodora 40: 472, *pl. 533*. 1938.

In preparing the treatment of *Coreopsis Linifolia* Nutt. for my monograph on *Coreopsis* (Field Mus. Bot. Ser. 11: 435. 1936) it was found that I had previously included several specimens of *C. longifolia* Small, because of improperly interpreting the two species. I therefore retained, for "specimens examined" of *C. Linifolia*, only a few that could be re-examined before going to press (and so stated on p. 436). Thus it happened that my carefully drawn description of geographic range of *C. Linifolia*, as starting in the north with North Carolina (the farthest north then known to me), was not supported by citation of any eastern-coastal specimens from farther north than Florida. Fernald (loc. cit.) seems to have been moved all too much by this fact in segregating as a new species, *C. Oniscicarpa*, some specimens recently collected in Virginia. Since the publication of his *C. Oniscicarpa*, I have been permitted through the kindness of various botanists to examine much additional material. Some of the specimens lent me by Mr. Charles A. Weatherby, Senior Curator of Gray Herbarium, and by Mr. Robert K. Godfrey, a graduate student at Harvard University, had come from Virginia and were the ones cited by Fernald for his *C. Oniscicarpa*, one of them being the type of that species. A careful comparison of each specimen with Floridan and other southern specimens of *C. Linifolia* Nutt. showed no constant differences in foliar or capitular characters to warrant separating *C. Oniscicarpa* even varietally from *C. Linifolia*.

Coreopsis lanceolata L. Sp. Pl. 908. 1753; *Coreopsis heterogyna* Fern. Rhodora 40: 475, *pl. 535, figs. 1–9*. 1938.

Coreopsis lanceolata L. offends notoriously the lover of constancy in growth form. Here and there throughout its geographic range it frequently produces variants that strongly suggest allied species or reciprocal variants of allied species (such as *C. grandiflora* Hogg, *C. pubescens* Ell., *C. auriculata* L., and *C. intermedia* Sherff). One such variant is the form recently described by Fernald as *C. heterogyna*. In proposing this form as a new species, Fernald appears to have been misled by placing too much stress upon a necessarily arbitrary and narrow description (in this case, of *C. lanceolata*, from which he

sought to differentiate it) found in literature, rather than upon a study of sufficiently numerous and thus sufficiently representative *exsiccatae*. In my monograph on *Coreopsis* (Field Mus. Bot. Ser. 11: 341. 1936), a work much cited by Fernald, I included numerous forms of wide geographic distribution and more or less matching *C. heterogyna* in foliage, among them: *Lansing* 935, Clarke, Indiana; *Lighthipe*, Monticello, Florida; *Rolfs* 309, Florida; *Schuette*, Door, Wisconsin; *Whitford* 203, Cold Spring Harbor, New York (all in Herb. Field Mus.). Fernald emphasizes the large central achenes of *C. heterogyna*, these having bodies 3.5–4 mm. long and 2–2.5 mm. wide and brown wings 1–1.5 mm. wide. The Lansing specimen has many central achenes with a body about 3 mm. long and 1.4–2 mm. wide and brown wings 0.7–1 mm. wide. The Rolfs specimen has several central achenes with a body 3.1 mm. long and 2–2.2 mm. wide and brown wings about 0.3–0.4 mm. wide (in measuring body length I have uniformly measured merely the distance in a straight line from one end of the curved body to the other; if the curved body were softened and flattened out it would of course measure more). I have before me other specimens with central achenial measurements slightly half as great. With such a range of achenial variation as *C. lanceolata* thus displays, it appears futile to attempt the maintenance of Fernald's *C. heterogyna* even as a variety or forma (i.e., of *C. lanceolata*).[1]

Coreopsis grandiflora var. **Harveyana** (A. Gray) Sherff, Bot. Gaz. 94: 593. 1933; Field Mus. Bot. Ser. 11: 355. 1936.

Heretofore I have seen no specimens of this variety from east of Missouri and Arkansas. Among some Alabama plants recently sent me by Dr. H. K. Svenson of the Brooklyn Botanical Garden, was one that very definitely belongs here, although it is seen, on comparison with numerous Missouri and Arkansas specimens, to be

[1] Fernald's other distinctions drawn for *C. heterogyna* likewise disappear upon examination of abundant material. Thus, for example, he illustrates (*fig. 2*, loc. cit.) the involucre of *C. heterogyna* with its reflexed outer bracts. He contrasts *C. lanceolata* as having the outer bracts (*fig. 12*, loc. cit.) "remaining appressed-ascending." It is difficult to understand how he would advance a "distinction" so utterly untenable. Much (though by no means all or even one-half) of the *C. lanceolata* fruiting material found in herbaria has all or most of the outer bracts *definitely spreading or reflexed* and *involucres large*, as in Fernald's illustration (*fig. 2*) of that for *C. heterogyna*. I have before me the following such specimens belonging to the Field Museum of Natural History: *J. J. Davis*, Sheboygan, Wisconsin, July 16, 1929; *F. C. Gates* 13,128, Emmet County, Michigan, July 29, 1921; *R. K. Godfrey*, near Raleigh, North Carolina, May 22, 1937; *J. H. Schuette*, north of Sturgeon Bay Canal, Wisconsin, July 14, 1890; *H. N. Whitford* 64, Cold Spring Harbor, New York, August, 1903. In addition to these specimens may be cited two additional ones possessing such characters but belonging rather with *C. lanceolata* var. *villosa* Michx.: *Dr. Josiah Hale*, Louisiana; *Earl E. Sherff* 5,013, cult., Cambridge,

slightly atypic. It was collected by R. N. Harper and H. K. Svenson, on exposed granite, Flat Rock (north of Ashland), August 3, 1938. A specimen is in Field Museum.

Coreopsis pubescens var. **robusta** A. Gray *ex* Eames, Rhodora 18: 239. 1916; Sherff, Field Mus. Bot. Ser. 11: 351. 1936.

Previously examined specimens showed for this variety a range of Virginia and North Carolina. This range is now extended to include Alabama, where it has been collected by R. N. Harper and H. K. Svenson, on dry ravine slopes, Brush Creek, east of Tuscaloosa, August 2, 1938. A specimen (now in Field Museum) was among those very kindly sent me by Dr. Svenson.

Dubautia laxa Skottsbergii var. nov.

Folia tenuiora, anguste ovata vel saepius late oblanceolata, utrinque adpresso-hispida, 4–7 cm. longa et 1–1.8 cm. lata. Inflorescentia ignota.

Leaves thinner, narrowly ovate or more often widely oblanceolate, on both surfaces appressed-hispid, 4–7 cm. long and 1–1.8 cm. wide. Inflorescence unknown.

Specimens examined: *Lucy M. Cranwell, Olof H. Selling, & Carl Skottsberg* 2976, between Lehuamakanoi and the main bog, Alakai, northwestern Kauai, August 16, 1938 (type, Goth.).

Dubautia laxa Hook. & Arn. is represented in the northwestern part of the Island of Kauai only by its variety *pedicellata* Rock. From this variety, as indeed from all other known varieties of *D. laxa*, the material here described differs at once in its much smaller or proportionately narrower and its somewhat thinner leaves. The two specimens constituting the type both lack flowers and fruits, which are much to be desired.

Massachusetts, August 12, 1929. It thus becomes evident that, even if Fernald were to attempt maintenance of his *heterogyna* form as a variety of *C. lanceolata*, he would at once be under compulsion to disentangle his reported involucral characters for *heterogyna* from the pubescence character commonly associated with var. *villosa*, failing which, he might conceivably have to accept the earlier varietal name *villosa* Michx. (my own notes taken in Paris are silent as to the exact characters of the type of var. *villosa* Michx.).

At all events, it seems regrettable that in proposing *Coreopsis heterogyna* and numerous other so-called "species" and "varieties" as new, Fernald has proceeded all too often from the standpoint of local floristics, ignoring the fruits of extended monographic research. As every competent monographer can testify, one of the chief causes contributing in the past to the cluttering of our nomenclature with synonyms has been the provincialized and untenable concepts proposed either by students of local floristics or by students who, while emphasizing the importance of monographic research in their own favorite groups, chose to minimize it elsewhere.

The variety is named for Dr. Skottsberg, one of its collectors, in grateful appreciation of his invaluable assistance, over a period of years, upon *Dubautia* and various other Polynesian genera.

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